

حمل الآن

مجاناً وحصرياً

المراجعة رقم (1)

اختبار شهر اكتوبر





Quiz

1

on lesson 1 – unit 1

Total mark

10

Answer the following questions :

First question

6 marks

each item 1 mark

Choose the correct answer from those given :

(1) $\sqrt{-2} \times \sqrt{-8} = \dots\dots\dots$

- (a) 4 (b) -4 (c) $4i$ (d) -16

(2) The simplest form of the imaginary number i^{42} is $\dots\dots\dots$

- (a) -1 (b) 1 (c) i (d) $-i$

(3) The solution set of the equation : $x^2 + 9 = 0$ in $\mathbb{C}$ is $\dots\dots\dots$

- (a) $\{3, -3\}$ (b) $\{-3i\}$ (c) $\{3i, -3i\}$ (d) $\emptyset$

(4) If the curve of the quadratic function f intersects the x -axis at the two points $(3, 0)$, $(-1, 0)$, then the solution set of the equation : $f(x) = 0$ in $\mathbb{R}$ is $\dots\dots\dots$

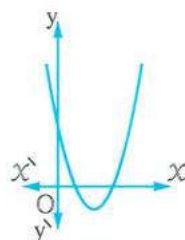
- (a) $\{3, 0\}$ (b) $\{-1, 0\}$ (c) $\{-3, 1\}$ (d) $\{3, -1\}$

(5) $1 + i + i^2 + i^3 + i^4 + \dots + i^{16} = \dots\dots\dots$

- (a) i (b) 1 (c) 16 (d) 4

(6) The opposite figure represents the curve $y = ax^2 + bx + c$. Which of the following is true ?

- (a) $a < 0, c < 0$ (b) $a > 0, c < 0$
(c) $a < 0, c > 0$ (d) $a > 0, c > 0$



Second question

4 marks

[a] 2 marks

[b] 2 marks

[a] Find in $\mathbb{C}$ the solution set of the equation :

$$x^2 - 2x + 4 = 0$$

[b] Find the values of x and y which satisfy that :

$$x + iy = \frac{(2+i)(2-i)}{3+2i}$$

Quiz

2

till lesson 2 – unit 1

Total mark
10

Answer the following questions :

First question

6 marks

each item 1 mark

Choose the correct answer from those given :

(1) If the two roots of the equation : $4x^2 - 12x + c = 0$ are equal , then $c = \dots\dots\dots$

- (a) 3 (b) 4 (c) 9 (d) 16

(2) If $x = -1$ is one of the roots of the equation : $x^2 - ax - 2 = 0$, then $a = \dots\dots\dots$

- (a) 1 (b) -1 (c) 3 (d) -3

(3) If $a = 1 + \sqrt{2}i$, $b = 1 - \sqrt{2}i$, then $ab = \dots\dots\dots$

- (a) -1 (b) 1 (c) 2 (d) 3

(4) If the two roots of the equation : $x^2 - 6x + k = 0$ are different and real , then $k \in \dots\dots\dots$

- (a) $]-\infty, 9[$ (b) $]9, \infty[$ (c) $]-\infty, 9]$ (d) $]9, \infty[$

(5) If the roots of the equation : $ax^2 + bx + c = 0$ are conjugate complex , which of the following is true ?

- (a) $b^2 - 4ac < 0$ (b) $b^2 - 4ac = 0$ (c) $b^2 - 4ac > 0$ (d) $b^2 - 4ac \leq 0$

(6) $(2 + 2i)^{20} = \dots\dots\dots$

- (a) 2^{20} (b) 2^{30} (c) $2^{20}i$ (d) -2^{30}

Second question

4 marks

[a] 2 marks

[b] 2 marks

[a] Prove that the two roots of the equation : $3x^2 - 4x + 5 = 0$ are not real , then find the solution set of the equation in $\mathbb{C}$

[b] Find the values of k which make the equation : $kx^2 - 4x + 4 = 0$ have two complex and not real roots.

Quiz**3****till lesson 3 – unit 1**Total mark
10*Answer the following questions :***First question****6 marks**

each item 1 mark

Choose the correct answer from those given :

- (1) If one of the two roots of the equation : $x^2 - (m - 3)x + 5 = 0$ is the additive inverse of the other root , then $m = \dots\dots\dots$
- (a) - 5 (b) - 3 (c) 3 (d) 5
- (2) The simplest form of the imaginary number i^{31} is $\dots\dots\dots$
- (a) i (b) $-i$ (c) 1 (d) - 1
- (3) If one of the two roots of the equation : $ax^2 + 2x + 5 = 0$ is the multiplicative inverse of the other root , then $a = \dots\dots\dots$
- (a) - 5 (b) - 2 (c) 2 (d) 5
- (4) If the two roots of the equation : $x^2 + 4x + k = 0$ are real , then $k \in \dots\dots\dots$
- (a) $[4, \infty[$ (b) $]4, \infty[$ (c) $] - \infty, 4]$ (d) $] - \infty, 4[$
- (5) If the roots of the quadratic equation : $ax^2 + bx - c = 0$ have different signs , then $\dots\dots\dots$
- (a) $b = 0$ (b) $c < 0$ (c) $\frac{c}{a} < 0$ (d) $\frac{c}{a} > 0$
- (6) If $(1 + i^8)(1 - i^{11}) = x + yi$, then $x + y = \dots\dots\dots$
- (a) 4 (b) 3 (c) 2 (d) 1

Second question**4 marks**

[a] 2 marks

[b] 2 marks

[a] If the two roots of the equation : $x^2 - 3x + 2 + \frac{1}{m} = 0$ are equal , find the value of : m

[b] Find the value of k which makes one of the two roots of the equation :

$$x^2 + 3x + k = 0 \text{ double the other root.}$$

Second Accumulative quizzes on trigonometry



Quiz

1

on lesson 1 – unit 2

Total mark
10

Answer the following questions :

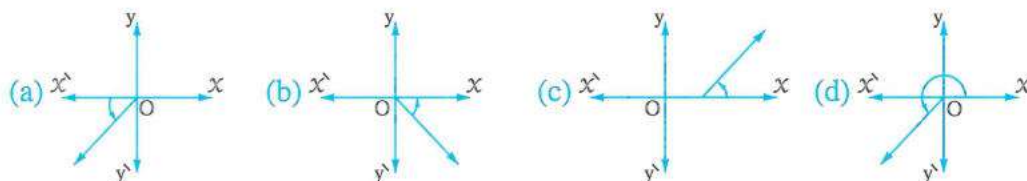
First question

6 marks

each item 1 mark

Choose the correct answer from those given :

- (1) The angle of measure 50° in the standard position is equivalent to the angle of measure
- (a) 130° (b) 310° (c) 140° (d) 410°
- (2) All the following are measures of angles that lie in the second quadrant except
- (a) -210° (b) 120° (c) -120° (d) 850°
- (3) The angle whose measure is (-750°) lies in the quadrant.
- (a) first (b) second (c) third (d) fourth
- (4) All the following directed angles are not in the standard position except



- (5) If the terminal side of an angle in the standard position passes through the point $(-1, 0)$, then the terminal side lies in the
- (a) first quadrant. (b) second quadrant. (c) third quadrant. (d) something else.
- (6) If A, B are the measures of two equivalent angles, then : $-A, -B$ are
- (a) supplementary. (b) equivalent. (c) complementary. (d) their sum is -360°

Second question

4 marks

[a] 2 marks

[b] 2 marks

[a] Determine the quadrant in which each of the following angles lie :

- (1) -52° (2) 220° (3) 1120°

[b] Find two angles, one of them with positive measure and the other with negative measure having common terminal side for each of the following angles :

- (1) -132° (2) 70° (3) -730°

Quiz**2****till lesson 2 – unit 2**

Answer the following questions :

First question**6 marks**

each item 1 mark

Choose the correct answer from those given :

- (1) The angle whose measure is $\frac{9\pi}{4}$ lies in the quadrant.
(a) first (b) second (c) third (d) fourth
- (2) The degree measure of a central angle in a circle of radius length 6 cm. and opposite to an arc of length 3π cm. equals
(a) 30° (b) 60° (c) 90° (d) 120°
- (3) The angle whose measure is -7.3^{rad} is equivalent to the angle whose degree measure is
(a) $58^\circ 15' 33''$ (b) $301^\circ 44' 27''$ (c) $-233^\circ 15' 33''$ (d) $211^\circ 44' 27''$
- (4) The radian measure of the central angle subtending an arc of length 3 cm. in a circle whose diameter length is 4 cm. equals
(a) $\left(\frac{2}{3}\right)^{\text{rad}}$ (b) $\left(\frac{3}{2}\right)^{\text{rad}}$ (c) 5^{rad} (d) 6^{rad}
- (5) The positive measure of the angle between the hour hand and the minute hand at half past two equals
(a) $\frac{\pi}{4}$ (b) $\frac{5\pi}{12}$ (c) $\frac{7\pi}{12}$ (d) $\frac{3\pi}{4}$
- (6) If A , - A are measures of two equivalent angles , then one of the values of A is
(a) 150° (b) 90° (c) 180° (d) 270°

Second question**4 marks**

[a] 2 marks

[b] 2 marks

- [a] Find the length of the arc which is opposite to an inscribed angle of measure 60° , in a circle whose radius length is 10 cm.
- [b] ABC is a triangle in which : $m(\angle A) = 70^\circ$, $m(\angle B) = 60^\circ$, find in radian measure $m(\angle C)$

Quiz

3

till lesson 3 – unit 2



Answer the following questions :

First question

6 marks

each item 1 mark

Choose the correct answer from those given :

- (1) The radian measure of the central angle which subtends an arc of length 5 cm. in a circle of diameter length 10 cm. equals

(a) $\frac{1}{2}^{\text{rad}}$ (b) 1^{rad} (c) 2^{rad} (d) π

- (2) The measure of the smallest positive angle equivalent to the angle whose measure is (-870°) is

(a) 210° (b) 150° (c) -210° (d) 120°

- (3) If θ is the measure of a directed angle drawn in the standard position where $\sin \theta < 0$, in which quadrant does the terminal side of the angle θ lie ?

(a) first. (b) first and second.
(c) second and third. (d) third and fourth.

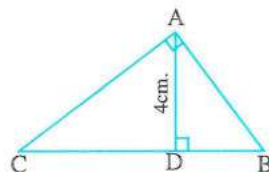
- (4) If $\sec \theta = 2$ where θ is the measure of an acute positive angle, then $\theta = \dots\dots\dots$

(a) 30° (b) 60° (c) 45° (d) 90°

- (5) In the opposite figure :

If $\tan B + \tan C = \frac{5}{2}$
, then $BC = \dots\dots\dots$ cm.

(a) 6 (b) 8
(c) 10 (d) 14



- (6) The length of the string of a simple pendulum is 14 cm. and swing through an angle of measure $\frac{1}{10} \pi$, then its arc length $\approx \dots\dots\dots$ cm.

(a) 4.6 (b) 4.4 (c) 4.2 (d) 4.8

Second question

4 marks

[a] 2 marks

[b] 2 marks

[a] Without using calculator, find the value of :

$$3 \sin 30^\circ \sin^2 60^\circ - \cos 0^\circ \sec 60^\circ + \sin 270^\circ \cos^2 45^\circ$$

[b] If $\sin \theta = \frac{3}{5}$, $\theta \in \left[\frac{\pi}{2}, \pi \right]$, find all trigonometric functions of the angle whose measure is θ

Quiz

1

on lesson 1 – unit 3

Total mark
10

Answer the following questions :

First question

6 marks

each item 1 mark

Choose the correct answer from those given :

- (1) Two similar polygons , the ratio between the lengths of two corresponding sides in them is 2 : 3 , if the perimeter of the smaller is 14 cm. , then the perimeter of the bigger is cm.

(a) 14 (b) 28 (c) 15 (d) 21

- (2) In the opposite figure :

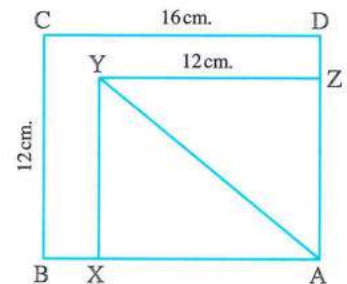
If rectangle ABCD ~ rectangle AXYZ

, DC = 16 cm.

, BC = ZY = 12 cm.

, then AY = cm.

(a) 20 (b) 9
(c) 15 (d) 18



- (3) Two similar triangles , in which $\frac{AB}{XY} = \frac{AC}{YZ} = \frac{BC}{ZX}$, which of the following is false ?

(a) $\Delta ABC \sim \Delta XYZ$ (b) $m(\angle C) = m(\angle Z)$
(c) $m(\angle ABC) = m(\angle YXZ)$ (d) $\Delta ABC \sim \Delta YXZ$

- (4) Which of the following is always true ?

(a) All regular polygons are similar. (b) All squares are congruent.
(c) All equilateral triangles are similar. (d) All rhombuses are similar.

- (5) If $\Delta LMN \sim \Delta XYZ$, $m(\angle L) = 35^\circ$ and $m(\angle Z) = 75^\circ$, then $m(\angle M) =$

(a) 110° (b) 35° (c) 75° (d) 70°

- (6) If k is the scale factor of similarity between two polygons M_1 to M_2 where M_1 is reduction of polygon M_2 , then

(a) $k > 0$ (b) $k = 1$ (c) $k > 1$ (d) $0 < k < 1$

Second question

4 marks

(1) 2 marks

(2) 2 marks

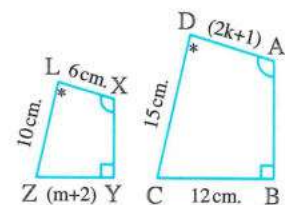
In the opposite figure :

Polygon ABCD ~ polygon XYZL

- (1) Find the scale factor of similarity

between the polygon ABCD and the polygon XYZL

- (2) Find the value of each of : m , k



Quiz

2

on lesson 2 – unit 3



Answer the following questions :

First question

6 marks

each item 1 mark

Choose the correct answer from those given :

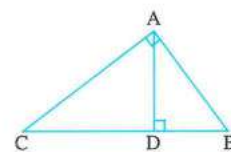
- (1) Two similar rectangles , the two dimensions of the first are 12 cm. , 8 cm. and the perimeter of the second is 60 cm. , then the length of the second rectangle is

(a) 12 cm. (b) 18 cm. (c) 24 cm. (d) 16 cm.

- (2) In the opposite figure :

Which of the following expressions is wrong ?

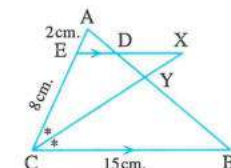
(a) $(AB)^2 = BD \times DC$ (b) $(AC)^2 = CD \times CB$
(c) $(AD)^2 = DB \times DC$ (d) $AB \times AC = BC \times AD$



- (3) In the opposite figure :

If $\overrightarrow{CX}$ bisects $\angle ACB$, $\overrightarrow{XD} \parallel \overrightarrow{BC}$
 , then $XD = \dots\dots\dots$ cm.

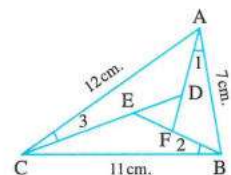
(a) 3 (b) 4 (c) 5 (d) 6



- (4) In the opposite figure :

If $m(\angle 1) = m(\angle 2) = m(\angle 3)$
 , then $DE : EF : FD = \dots\dots\dots$

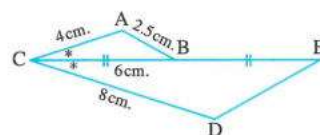
(a) 7 : 11 : 12 (b) 12 : 11 : 7
(c) 12 : 7 : 11 (d) 11 : 12 : 7



- (5) In the opposite figure :

If B is the midpoint of $\overline{CE}$
 , then $DE = \dots\dots\dots$ cm.

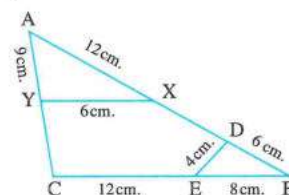
(a) 4 (b) 5 (c) 6 (d) 7



- (6) In the opposite figure :

$YC = \dots\dots\dots$ cm.

(a) 9 (b) 10
(c) 11 (d) 12



Second question

4 marks

(1) 2 marks

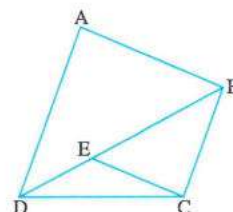
(2) 2 marks

In the opposite figure :

ABCD is a quadrilateral

, $E \in \overline{BD}$ where $\frac{AB}{DA} = \frac{CE}{BC}$, $\frac{BD}{DA} = \frac{EB}{BC}$

Prove that : (1) $\overline{AD} \parallel \overline{BC}$ (2) $\overline{AB} \parallel \overline{CE}$



Answer the following questions :

First question

6 marks

each item 1 mark

Choose the correct answer from those given :

(1) If the ratio between the perimeters of two similar polygons is 4 : 9 , then the ratio between their areas is

- (a) 4 : 9 (b) 2 : 3 (c) 16 : 81 (d) 8 : 18

(2) In the opposite figure :

$x = \dots\dots\dots$

- (a) $\frac{15}{2}$ (b) 27
(c) 14 (d) $10\frac{1}{2}$

(3) In the opposite figure :

$x = \dots\dots\dots$

- (a) 4.5 (b) 4
(c) 6 (d) 36

(4) In the opposite figure :

$x + y + z = \dots\dots\dots$

- (a) 15 (b) 18.2
(c) 22 (d) 22.2

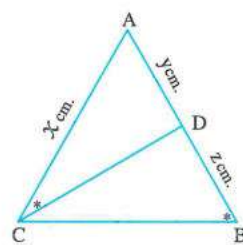
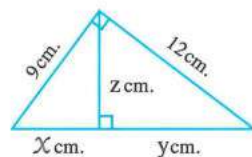
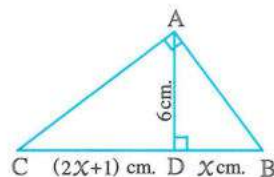
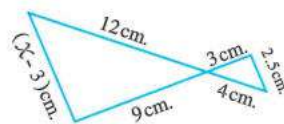
(5) In the opposite figure :

$x^2 - y^2 = \dots\dots\dots$

- (a) $(x - y)^2 - 2xy$ (b) z^2
(c) zy (d) zero

(6) If $\triangle XYZ \sim \triangle ABC$, a $(\triangle XYZ) = 3$ a $(\triangle ABC)$ and $XY = 3$ cm. , then $AB = \dots\dots\dots$ cm.

- (a) $\sqrt{3}$ (b) $3\sqrt{3}$ (c) $\frac{1}{\sqrt{3}}$ (d) 3



Second question

4 marks

ABCD , XYZL are two similar polygons. If M is the midpoint of $\overline{BC}$, N is the midpoint of $\overline{YZ}$, $AM = 4$ cm. , $XN = 9$ cm.

, prove that : area of polygon ABCD : area of polygon XYZL = 16 : 81



Test 1

1 Choose the correct answer from those given :

(1) $\sqrt{-4} \times \sqrt{-9} = \dots\dots\dots$

- (a) 6 (b) -6 (c) 6i (d) -6i

(2) If the roots of the equation : $kx^2 - 8x + 16 = 0$ are two complex and non real , then $\dots\dots\dots$

- (a) $k > 2$ (b) $k < 2$ (c) $k \in]1, 10[$ (d) $k > 1$

(3) If $\triangle ABC \sim \triangle XYZ$ and $AB = 3XY$, then $\frac{\text{area}(\triangle XYZ)}{\text{area}(\triangle ABC)} = \dots\dots\dots$

- (a) 3 (b) 9 (c) $\frac{1}{3}$ (d) $\frac{1}{9}$

(4) If the terminal side of an angle of measure (-30°) in standard position is rotated anticlockwise one and half revolutions , then the terminal side will be in the $\dots\dots\dots$ quadrant.

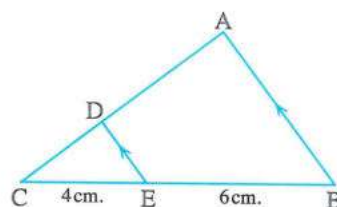
- (a) first (b) second (c) third (d) fourth

(5) In the opposite figure :

If the area of the figure ABED = 42 cm^2

, then the area of $\triangle CED = \dots\dots\dots \text{ cm}^2$

- (a) 8 (b) 12
(c) 16 (d) 20

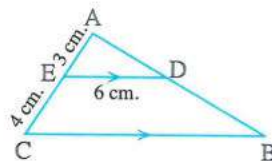


(6) In the opposite figure :

$\overline{DE} \parallel \overline{BC}$, $AE = 3 \text{ cm.}$, $EC = 4 \text{ cm.}$

$DE = 6 \text{ cm.}$, then $BC = \dots\dots\dots \text{ cm.}$

- (a) 14 (b) 12
(c) 21 (d) 8



(7) If polygon ABCD $\sim$ polygon XYZL and $AB = 32 \text{ cm.}$, $BC = 40 \text{ cm.}$

, $XY = 3m - 1$, $YZ = 3m + 1$, then $m = \dots\dots\dots$

- (a) 3 (b) 2 (c) 1 (d) 4

(8) If $(2 - i)$ is one of the roots of the equation : $x^2 + b x + c = 0$ where $b, c \in \mathbb{R}$, then $(b, c) = \dots\dots\dots$

- (a) $(4, 5)$ (b) $(-4, -5)$ (c) $(4, -5)$ (d) $(-4, 5)$

(9) If $x + y i = (1 - 2 i) (1 + i)$ where $x, y \in \mathbb{R}$, then $x + y = \dots\dots\dots$

- (a) 2 (b) -2 (c) 3 (d) 4

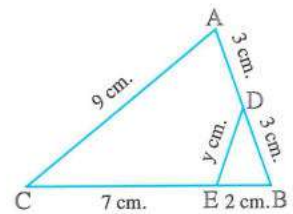
(10) ABCD is a cyclic quadrilateral, $m(\angle A) = 60^\circ$, then $m(\angle C) = \dots\dots\dots$

- (a) $\frac{\pi}{3}$ (b) $\frac{\pi}{6}$ (c) $\frac{2\pi}{3}$ (d) $\frac{5\pi}{6}$

(11) In the opposite figure :

$y = \dots\dots\dots$ cm.

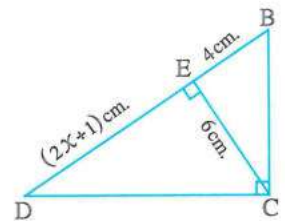
- (a) 2 (b) 4.5
(c) 3.5 (d) 3



(12) In the opposite figure :

$x = \dots\dots\dots$ cm.

- (a) 8 (b) 4
(c) 6 (d) 4.8



2 Answer the following questions :

(1) Find the real values of x and y that satisfy : $\frac{(2 + i) (2 - i)}{4 + 3 i} = x + y i$

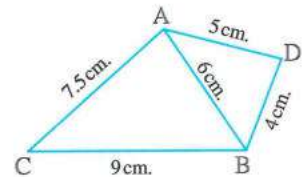
(2) In the opposite figure :

ABC is a triangle in which : $AB = 6$ cm. , $BC = 9$ cm. ,

$AC = 7.5$ cm. , D is a point outside the triangle ABC where

$DB = 4$ cm. , $DA = 5$ cm. **Prove that :**

- (a) $\triangle ABC \sim \triangle DBA$
(b) $\overrightarrow{BA}$ bisects $\angle DBC$



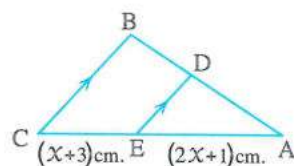
Test 2

1 Choose the correct answer from those given :

(1) In the opposite figure :

If $AD : AB = 3 : 5$, $\overline{DE} \parallel \overline{BC}$, then $x = \dots\dots\dots$ cm.

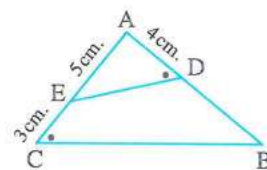
- (a) 5 (b) 3
(c) 4 (d) 7



(2) In the opposite figure :

$BD = \dots\dots\dots$ cm.

- (a) 5 (b) 6
(c) 4 (d) 7

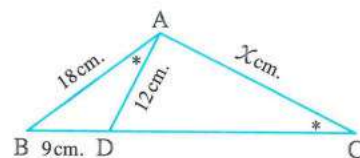


(3) In the opposite figure :

If $m(\angle DAB) = m(\angle C)$

, then $x = \dots\dots\dots$

- (a) 6 (b) 18 (c) 21 (d) 24

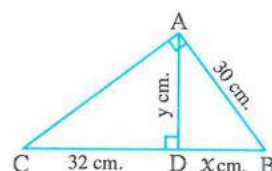


(4) In the opposite figure :

ABC is a right-angled triangle at A, $\overline{AD} \perp \overline{BC}$, $AB = 30$ cm.

, $DC = 32$ cm., then $x + y = \dots\dots\dots$

- (a) 36 (b) 48 (c) 42 (d) 52



(5) The angle of radian measure $\left(\frac{7\pi}{6}\right)$ has degree measure of

- (a) 225° (b) 210° (c) 840° (d) -225°

(6) The angle of measure -870° lies in the quadrant.

- (a) first (b) second (c) third (d) fourth

(7) If $x + yi = (1 + i)^4$ where $x, y \in \mathbb{R}$, then $x - y = \dots\dots\dots$

- (a) 16 (b) -16 (c) 4 (d) -4

(8) $2 + i + i^2 + i^3 = \dots\dots\dots$

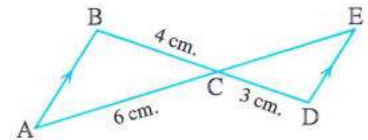
- (a) 2 (b) 1 (c) -1 (d) zero

(9) If the two roots of the equation : $x^2 - kx + 25 = 0$ are equal real roots
 , then $k = \dots\dots\dots$

- (a) 10 only. (b) - 10 only. (c) ± 10 (d) ± 5

(10) In the opposite figure :

If $\overline{AB} \parallel \overline{DE}$, $CD = 3$ cm. , $AC = 6$ cm. , $BC = 4$ cm.
 , then $CE = \dots\dots\dots$ cm.



- (a) 5.4 (b) 4.5 (c) 8 (d) 2.5

(11) If one of the roots of the equation : $x^2 - 5x + n = 0$ more than the other root by 1
 , then $n = \dots\dots\dots$

- (a) 2 (b) 2 or 3 (c) 6 (d) 8

(12) Two similar polygons , the ratio between the lengths of two corresponding sides
 is $3 : 4$, if the perimeter of the smaller is 15 cm. , then the perimeter of the bigger
 is $\dots\dots\dots$ cm.

- (a) 20 (b) $\frac{80}{3}$ (c) 27 (d) $\frac{45}{4}$

2 Answer the following questions :

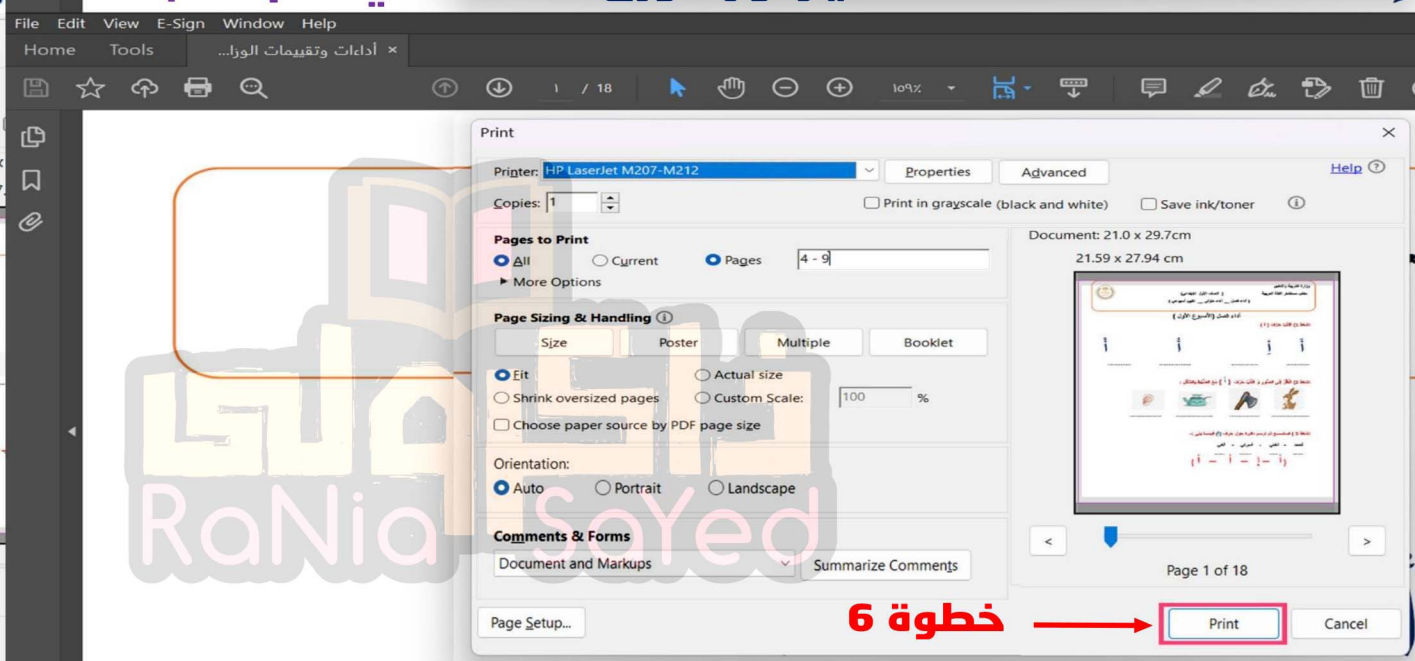
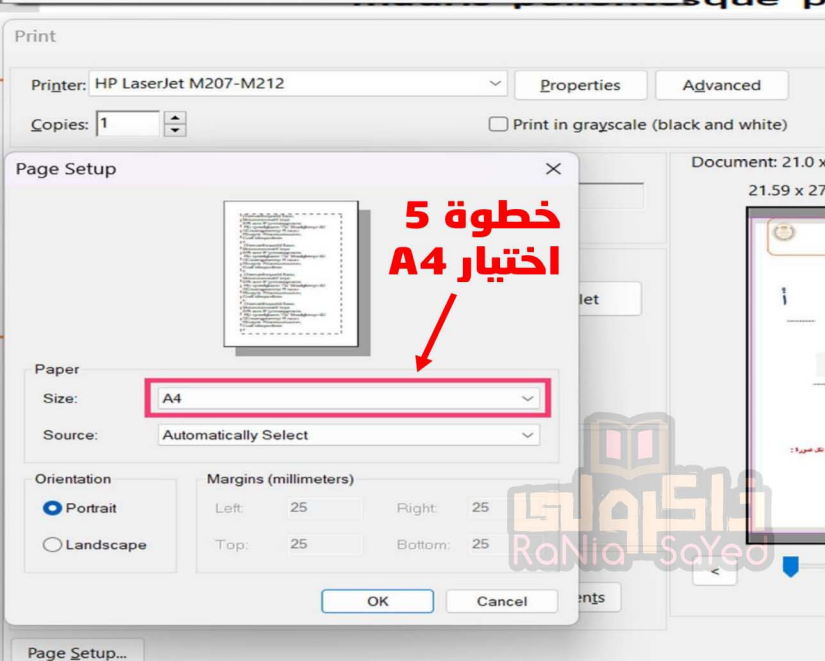
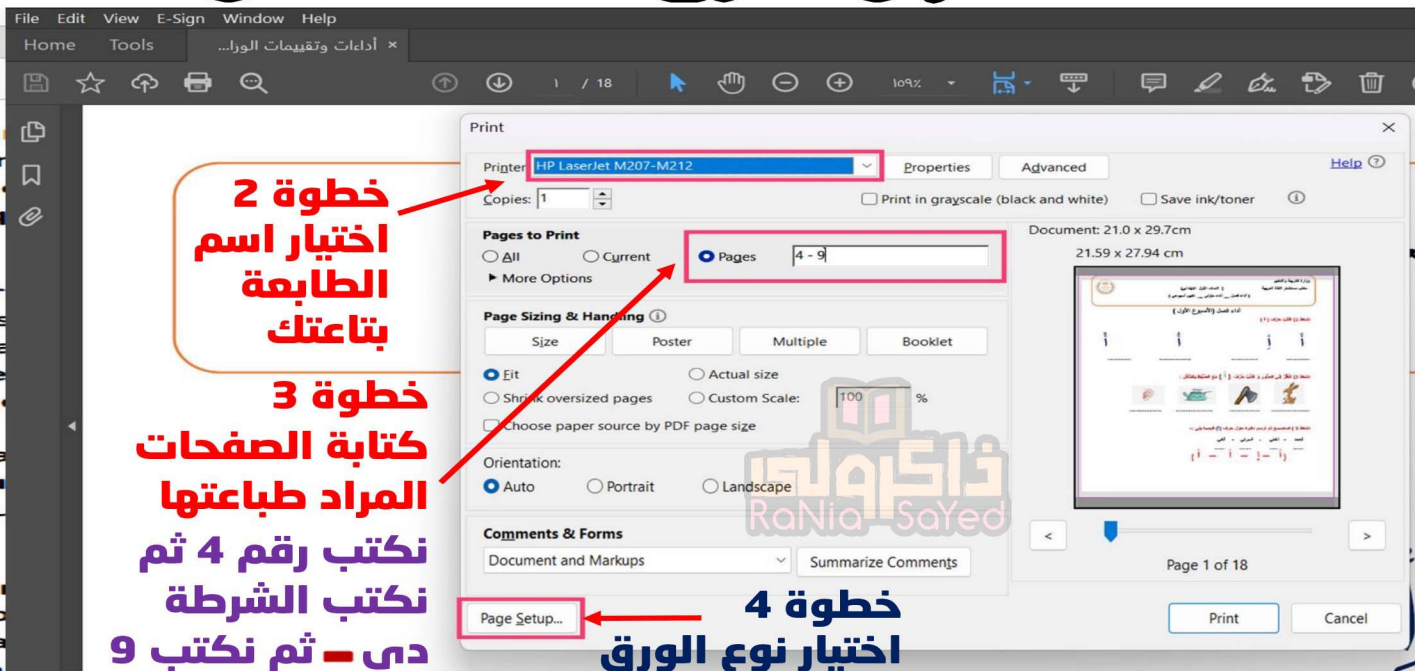
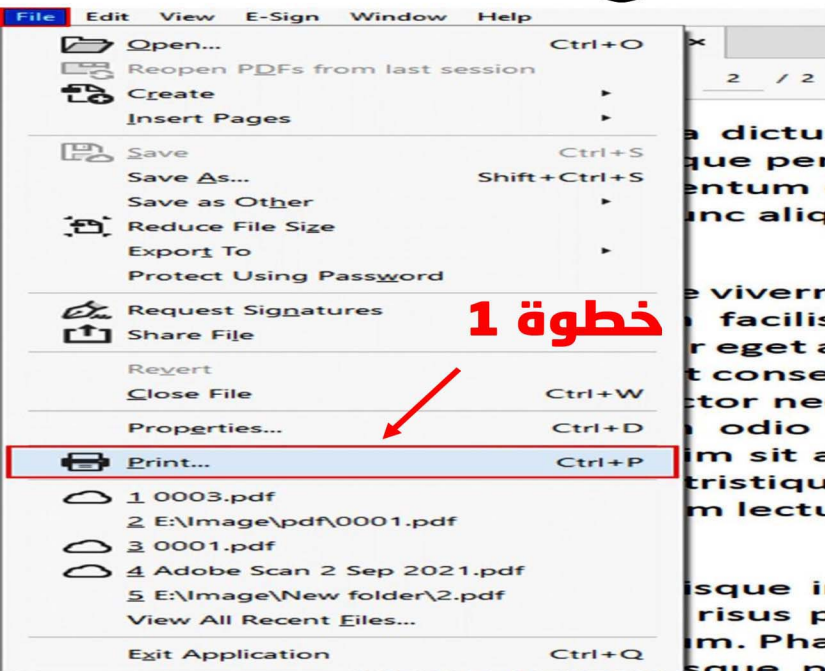
(1) Find the value of a which makes the sum of the two roots of the equation :

$x^2 - (a + 4)x + 3a^2 = 0$ equals the product of the two roots of the equation :

$$2x^2 - 7ax + a^2 = 0$$

(2) The ratio between the two perimeters of two similar triangles is $3 : 2$ and the sum of
 their areas is 130 cm^2 . Find the area of each of them.

كيفية طباعة صفحات معينة من ملف معين مثلا ازاي نطبع الصفحات من صفحة 4 الى صفحة 9



حمل الآن

مجاناً وحصرياً

المراجعة رقم (2)

اختبار شهر اكتوبر





Complex Numbers

1 - 2

① Simplify:

A i^{66}

B i^{-45}

C i^{4n+2}

D i^{4n-1}

② Simplify:

A $\sqrt{-18} \times \sqrt{-12}$

B $3i(-2i)$

C $(-4i)(-6i)$

D $(-2i)^3(-3i)^2$

③ Find in the simplest form:

A $(3+2i) + (2-5i)$

B $(26-4i) - (9-20i)$

C $(20+25i) - (9-20i)$

④ Rewrite each of the following in the form $a + bi$

A $(2+3i) - (1-2i)$

B $(1+2i^3)(2+3i^5+4i^6)$

⑤ Rewrite each of the following in the form $a + bi$

A $\frac{2}{1+i}$

B $\frac{4+i}{i}$

C $\frac{2-3i}{3+i}$

D $\frac{(3+i)(3-i)}{3-4i}$

⑥ Solve each of the following equations:

A $3x^2 + 12 = 0$

B $4y^2 + 20 = 0$

C $4z^2 + 72 = 0$

D $\frac{3}{5}y^2 + 15 = 0$

⑦ **Electricity:** find the total current intensity of the electric current passing through two resistances connected in parallel in a closed circuit if the current intensity in the first resistance is $(4-2i)$ ampere and in the second one is $\frac{6+3i}{2+i}$ ampere



Guide answer - complex numbers.

Exercise (1 – 2)

Q.	Answer
Q ₁	A) -1 B) -i C) -1 D) -i
Q ₃	A) 5 - 3i B) -55+176i C) 11 + 45i
Q ₅	A) 1-i B) 1- 4i C) $\frac{3-11i}{10}$ D) $\frac{6+8i}{5}$

Q.	Answer
Q ₂	A) $-6\sqrt{6}$ B) 6 C) -24 D) -72i
Q ₄	A) 1 + 5i B) 4 + 7i
Q ₆	A) $\pm\sqrt{3}i$ B) $\pm\sqrt{5} i$ C) $\pm 3\sqrt{2}i$ D) $\pm 5i$



1 - 3

Determining the type of roots of a Quadratic equation

First: Multiple choice:

- ① The two roots of the equation $x^2 - 4x + k = 0$ are equal if:
 (A) $k = 1$ (B) $k = 4$ (C) $k = 8$ (D) $k = 16$
- ② The two roots of the equation $x^2 - 2x + M = 0$ are real different if :
 (A) $M = 1$ (B) $M < 1$ (C) $M > 1$ (D) $M = 4$
- ③ The two roots of the equation $Lx^2 - 12x + 9 = 0$ are complex and not real if :
 (A) $L > 4$ (B) $L < 4$ (C) $L = 4$ (D) $L = 1$

Second: Answer the following questions:

- ④ Determine the number of roots and their types in the following quadratic equation:
 (A) $x^2 - 2x + 5 = 0$
 (B) $3x^2 + 10x - 4 = 0$
 (C) $x^2 - 10x + 25 = 0$
 (D) $6x^2 - 19x + 35 = 0$
 (E) $(x - 11) - x(x - 6) = 0$
 (F) $(x - 1)(x - 7) = 2(x - 3)(x - 4)$
- ⑤ Find the solution of the following equations in the set of complex numbers using the general formula.
 (A) $x^2 - 4x + 5 = 0$
 (B) $2x^2 + 6x + 5 = 0$
 (C) $3x^2 - 7x + 6 = 0$
 (D) $4x^2 - x + 1 = 0$



6 Find the value of K in each of the following cases:

A If the two roots of the equation $x^2 + 4x + K = 0$ are real different.

.....

B If the two roots of the equation $x^2 - 3x + 2 + \frac{1}{K} = 0$ are equal.

.....

C If the two roots of the equation $Kx^2 - 8x + 16 = 0$ are complex and not real.

.....

7 If L and M are two rational numbers, then prove that the two roots of the equation:

$$Lx^2 + (L - M)x - M = 0$$

are two rational numbers .

.....

8 Population of Egypt in 2013 is estimated by the relation:

$Z = n^2 + 1.2n + 91$ where (n) is the number of years and (z) is the number of populations in millions.

A What is the population in 2013?

B Estimate the population in 2023.

C Estimate the number of years at which the population will be 334 million.

D Write a report showing the reasons for which the population is increasing and the way of its treatment.

9 **Discover the error:** What is the number of solutions of the equation $2x^2 - 6x = 5$ in R

Ahmed's answer

$$\begin{aligned} b^2 - 4ac &= (-6)^2 - 4 \times 2 \times 5 \\ &= 36 - 40 = -4 \end{aligned}$$

The discriminant is negative, then there is no real solutions

Karim's answer

$$\begin{aligned} b^2 - 4ac &= (-6)^2 - 4 \times 2 \times (-5) \\ &= 36 + 40 = 76 \end{aligned}$$

the discriminant is positive, then there are two real different solutions

10 If the two roots of the equation $x^2 + 2(K - 1)x + (2K + 1) = 0$ are equal, then find the real values of K, and the two roots.



Guide answer - Determining the type of roots of roots of a Quadratic equation Exercise (1 – 3)

Q.	Answer
Q₁ T₀ Q₃	1) D 2) C 3) A
Q₅	A) $2 + i$ B) $\frac{-3}{2} \pm \frac{1}{2} i$ C) $\frac{7}{6} \pm \frac{\sqrt{23}}{6} i$ D) $\frac{1}{8} \pm \frac{\sqrt{18}}{8} i$
Q₇	By your self
Q₉	Karims answer is right

Q.	Answer
Q₄	A) Two complex roots B) Two different roots C) Only one root D) Two complex roots E) Two different root F) Two different real root
Q₆	A) $K < 4$ B) $k = \frac{4}{5}$ C) $k > 1$
Q₈	A) 91 millions B) 203 millions C) $n = 15$
Q₁₀	$K = 0$ $k = 4$



1 - 4

The relation between two roots of the second degree equation and the coefficients of its terms

First: Complete each of the following:

- ① if $x = 3$ is one of the roots of the equation $x^2 + Mx - 27 = 0$, then $M = \dots\dots\dots$ and the other root is $\dots\dots\dots$
- ② If the product of the two roots of the equation : $2x^2 + 7x + 3K = 0$ equals the sum of the two roots of the equation: $x^2 - (K + 4)x = 0$, then $K = \dots\dots\dots$
- ③ The quadratic equation which each of its two roots increases 1 than each of the two roots of the quadratic equation $x^2 - 3x + 2 = 0$ is $\dots\dots\dots$
- ④ The quadratic equation which each of its two roots decreases 1 than each of the two roots of the quadratic equation $x^2 - 5x + 6 = 0$ is $\dots\dots\dots$

Second: multiple choice

- ⑤ If one of the two roots of the equation $x^2 - 3x + c = 0$ is twice the other, then $c = \dots\dots\dots$
(A) -4
(B) -2
(C) 2
(D) 4
- ⑥ If one of the two roots of the equation $ax^2 - 3x + 2 = 0$ is the multiplicative inverse of the other, then $a = \dots\dots\dots$
(A) $\frac{1}{3}$
(B) $\frac{1}{2}$
(C) 2
(D) 3
- ⑦ If one of the two roots of the equation $x^2 - (b - 3)x + 5 = 0$ is the additive inverse of the other, then $b = \dots\dots\dots$
(A) -5
(B) -3
(C) 3
(D) 5

Third : Answer the following questions

- ⑧ Find the sum and the product of the two roots in each of the following equations:
(A) $3x^2 + 19x - 14 = 0$
(B) $4x^2 + 4x - 35 = 0$
 $\dots\dots\dots$
 $\dots\dots\dots$
- ⑨ Find the value of a , then find the other root in each of the following equations:
(A) If: $x = -1$ is one of the two roots of the equation $x^2 - 2x + a = 0$ $\dots\dots\dots$
(B) If: $x = 2$ is one of the two roots of the equation $ax^2 - 5x + a = 0$ $\dots\dots\dots$



10 Find the values of a and b if:

- A** 2 and 5 are the two roots of the equation $x^2 + a x + b = 0$
- B** -3 and 7 are the two roots of the equation $ax^2 - b x - 21 = 0$
- C** -1 and $\frac{3}{2}$ are the two roots of the equation $a x^2 - x + b = 0$
- D** $\sqrt{3}i$ and $-\sqrt{3}i$ are the two roots of the equation $x^2 + a x + b = 0$

11 Investigate the type of the two roots in each of the following equations, then find the solution set of each equation:

- A** $x^2 + 2x - 35 = 0$
- B** $2x^2 + 3x + 7 = 0$
- C** $x(x - 4) + 5 = 0$
- D** $3x(3x - 8) + 16 = 0$

12 Find the value of c, if the two roots of the equation $c x^2 - 12x + 9 = 0$ are equal.

.....

13 Find the value of a, if the two roots of the equation $x^2 - 3x + 2 + \frac{1}{a} = 0$ are equal.

.....

14 Find the value of c, if the two roots of the equation $3x^2 - 5 x + c = 0$ are equal, then find the two roots.

.....

15 Find the value of K, if one a root of the equation $x^2 + (K - 1) x - 3 = 0$ is the additive inverse to the other root.

.....

16 Find the value of K, if one root of the equation $4 K x^2 + 7 x + K^2 + 4 = 0$ is the multiplicative inverse to the other root.

.....

17 Form the quadratic equation whose two roots are :

- A** -2, 4
- B** -5 i, 5 i
- C** $\frac{2}{3}, \frac{3}{2}$
- D** $1 - 3i, 1 + 3i$
- E** $3 - 2\sqrt{2}i, 3 + 2\sqrt{2}i$

18 Find the quadratic equation in which each of the two roots is twice one of the roots of the equation $2x^2 - 8x + 5 = 0$

.....



- 19 Find the quadratic equation in which each of the two roots exceeds 1 than one of the two roots of the equation : $x^2 - 7x - 9 = 0$
.....
- 20 Find the quadratic equation in which each of its two roots equals the square of the corresponding root of the equation : $x^2 + 3x - 5 = 0$
.....
- 21 If L and M are the two roots of the equation $x^2 - 7x + 3 = 0$, then find the quadratic equation whose roots are:
- (A) $2L, 2M$ (B) $L + 2, M + 2$ (C) $\frac{2}{L}, \frac{2}{M}$ (D) $L + M, LM$



Guide Answer – Algebra – Unit 1 – Lesson 4 – Exercise (1-4)

Q.	Answer
1)	6, -9
3)	$x^2 - 5x + 6 = 0$
5)	C
7)	C
9)	A) -3, 3 B) $2, \frac{1}{2}$
11)	A) $\{5, -7\} \in \mathbb{R}$ B) $\left\{\frac{-3}{4} + \frac{\sqrt{47}}{4}i, \frac{-3}{4} - \frac{\sqrt{47}}{4}i\right\} \in \mathbb{C}$ C) $\{2 + i, 2 - i\} \in \mathbb{C}$ D) $\left\{\frac{12+4\sqrt{6}}{3}, \frac{12-4\sqrt{6}}{3}\right\} \in \mathbb{R}$
13)	4
15)	1
17)	A) $x^2 - 2x - 8 = 0$ B) $x^2 + 25 = 0$ C) $6x^2 - 13x + 6 = 0$ D) $x^2 - 2x + 9 = 0$ E) $x^2 - 6x + 17 = 0$
19)	$x^2 - 9x - 1 = 0$
21)	A) $x^2 - 14x + 12 = 0$ C) $12x^2 - 14x + 1 = 0$

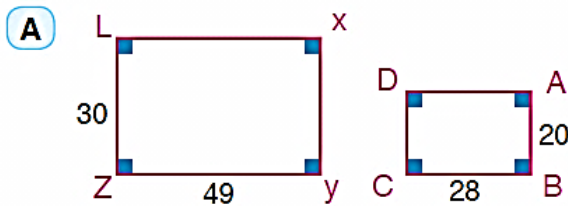
Q.	Answer
2)	8
4)	$x^2 - 3x + 2 = 0$
6)	C
8)	A) $\frac{-19}{3}, \frac{-14}{3}$ B) $-1, \frac{-35}{4}$
10)	A) -7, 10 B) 1, -4 C) 2, -3 D) 0, 3
12)	4
14)	$\frac{5}{6}$
16)	2
18)	$x^2 - 8x + 10 = 0$
20)	$x^2 - 19x + 25 = 0$
	B) $x^2 - 11x + 21 = 0$ D) $x^2 - 10x + 21 = 0$



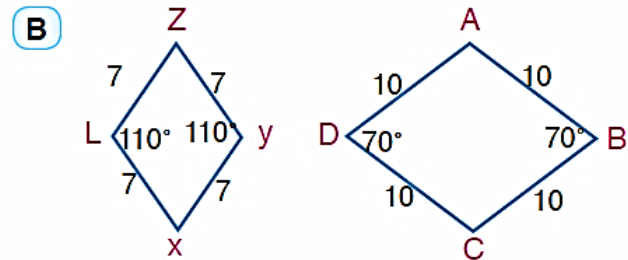
2 - 1

Similarity of Polygons

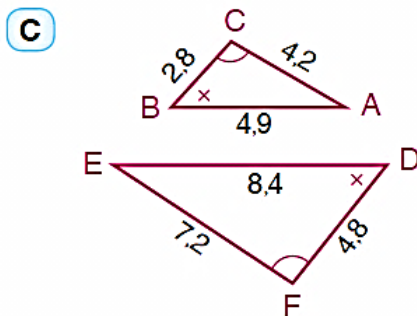
- 1 Show which of the following pairs of polygons are similar, write the similar polygons in order of their corresponding vertices and determine the scale factor of similarity (side lengths are estimated in centimetres).



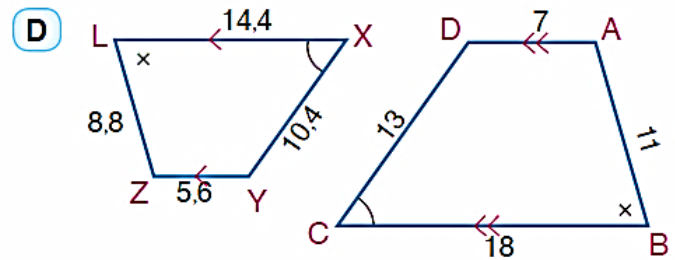
.....
.....



.....
.....



.....
.....



.....
.....

- 2 If polygon ABCD ~ polygon XYZL, complete:

A $\frac{AB}{BC} = \frac{\dots\dots\dots}{YZ}$

B $AB \times ZL = XY \times \dots\dots\dots$

C $\frac{BC + YZ}{YZ} = \frac{\dots\dots\dots + LX}{LX}$

D $\frac{\text{Perimeter of polygon } \dots\dots\dots}{\text{Perimeter of polygon } \dots\dots\dots} = \frac{XY}{AB}$

- 3 Polygon ABCD ~ polygon XYZL, If AB = 32cm, BC = 40 cm, XY = 3m - 1 and YZ = 3m + 1, Find the numerical value of m.

- 4 The dimensions of a rectangle are 10cm and 6cm. Find the perimeter and the area of another rectangle similar to it if:

A Scale factor equals 3.

B Scale factor equals 0,4

**Guide Answer – Geometry – Unit 2 – Lesson 1 – Exercise (2– 1)**

Q.	Answer
2)	a. xy b. CD c. AD d. Xyzl- ABCD
4)	a. peri.=96 cm Area=540 b. 12.8, 9.6

Q.	Answer
3)	3 cm

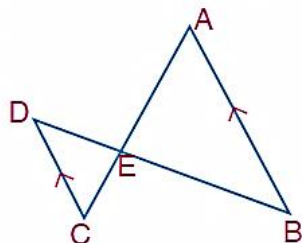


2 - 2

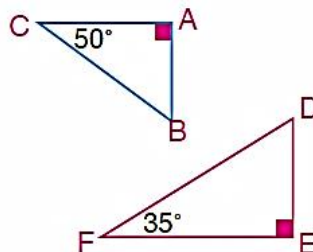
Similarity Of Triangles

- 1 State which of the following cases, the two triangles are similar. In case of similarity, state why they are similar?

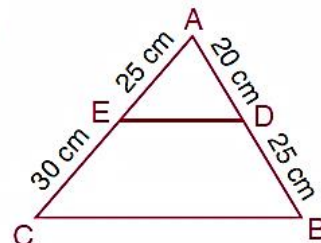
A



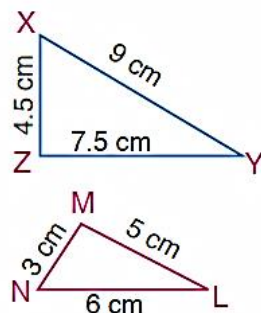
B



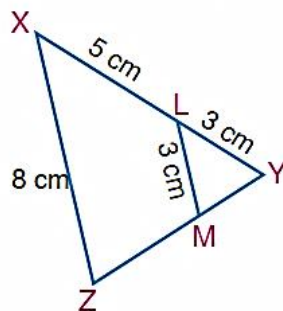
C



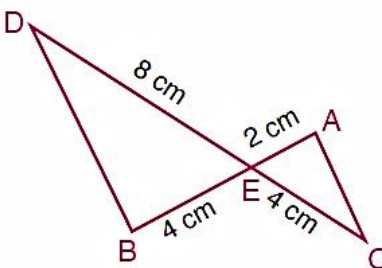
D



E

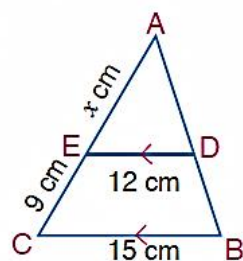


F

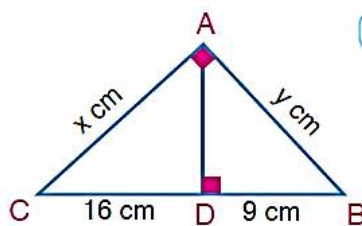


- 2 Find the value of the symbol used:

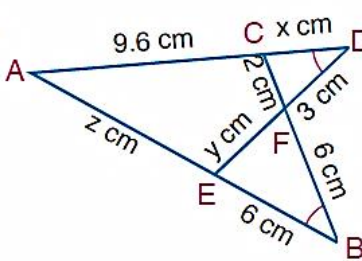
A



B



C

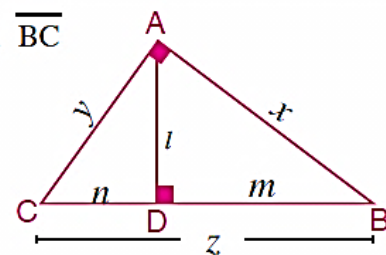




- ③ In the figure opposite: $\triangle ABC$ is a right angled triangle, $\overline{AE} \perp \overline{BC}$

First: complete: $\triangle ABC \sim \triangle \dots \sim \triangle \dots$

Second: If x, y, z, l, m and n are the lengths of the straight segments in centimetres, then complete the following proportions:



- A $\frac{x}{z} = \frac{m}{\dots}$ B $\frac{x}{z} = \frac{l}{\dots}$ C $\frac{m}{l} = \frac{x}{\dots}$ D $\frac{l}{\dots} = \frac{\dots}{l}$
 E $\frac{x}{\dots} = \frac{\dots}{x}$ F $\frac{\dots}{y} = \frac{y}{\dots}$ G $\frac{l}{x} = \frac{\dots}{z}$ H $\frac{l}{x} = \frac{\dots}{y}$

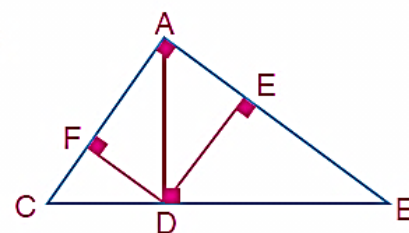
- ④ $\overline{AB}$ and $\overline{DC}$ are two chords in a circle, $\overline{AB} \cap \overline{DC} = \{E\}$, where E lies outside the circle, $AB = 4\text{cm}$, $DC = 7\text{cm}$ and $BE = 6\text{cm}$. prove that $\triangle ADE \sim \triangle CBE$, then find the length of $\overline{CE}$

- ⑤ $\triangle ABC$, and $\triangle DEF$ are two similar triangles, $\overline{AX} \perp \overline{BC}$ to intersect it at X, $\overline{DY} \perp \overline{EF}$ and intersects it at Y. Prove that $BX \times YF = CX \times YE$

- ⑥ In $\triangle ABC$, $AC > AB$, $M \in \overline{AC}$ where $m(\angle ABM) = m(\angle C)$.
Prove that $(AB)^2 = AM \times AC$.

- ⑦ $\triangle ABC$ is a right angled triangle at A, $\overline{AD} \perp \overline{BC}$ to intersect it at D. if $\frac{BD}{DC} = \frac{1}{2}$, $AD = 6\sqrt{2}\text{ cm}$. Find the length of $\overline{BD}$, $\overline{AB}$ and $\overline{AC}$.

- ⑧ In the figure opposite: $\triangle ABC$ is a right angled triangle at A,
 $\overline{AD} \perp \overline{BC}$, $\overline{DE} \perp \overline{AB}$, $\overline{DF} \perp \overline{AC}$. Prove that:



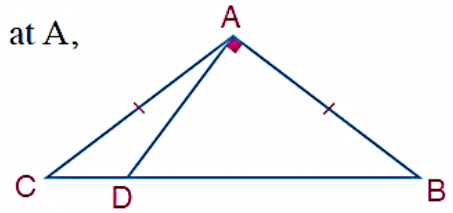
- A $\triangle ADE \sim \triangle CDF$
 B Area of rectangle AEDF = $\sqrt{AE \times EB \times AF \times FC}$



- 9 In the figure opposite: ABC is an obtuse angled triangle at A,

$AB = AC$. $\overrightarrow{AD} \perp \overline{AB}$ and intersects $\overline{BC}$ at D.

Prove that: $2(AB)^2 = BE \times BC$



- 10 The two sets A and B represent the side lengths of different triangles in centimetres. In front of each triangle from set A Write the triangle similar to it from set B

Set (A)

1	6	,	6	,	6
2	5	,	7	,	11
3	5	,	8	,	10
4	7	,	8	,	12
5	16	,	27	,	28

Set (B)

A	2.5	,	4	,	5
B	8	,	13,5	,	14
C	25	,	35	,	55
D	11	,	11	,	11
E	3,5	,	4	,	6
F	8	,	6	,	10
G	32	,	54	,	42

- 11 In the figure opposite: ABC is a triangle in which $AB = 6\text{ cm}$,

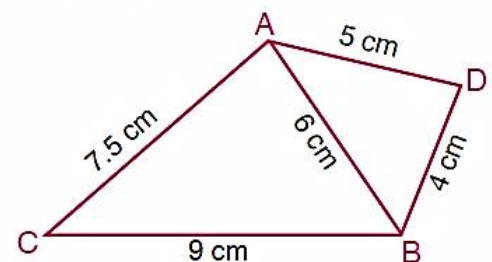
$BC = 9\text{ cm}$ and $AC = 7,5\text{ cm}$.

D is a point outside the triangle ABC

where $DB = 4\text{ cm}$ and $DE = 5\text{ cm}$. Prove that:

A $\triangle ABC \sim \triangle DBA$

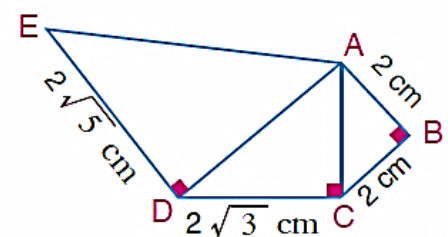
B $\overrightarrow{BA}$ bisects $\angle DBC$



- 12 In the figure opposite , Complete:

$\triangle ABC \sim \triangle$

and the scale factor =





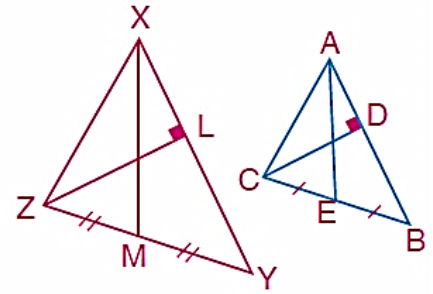
- 13 In the figure opposite: $\triangle ABC \sim \triangle XYZ$,

E is the mid point of $\overline{BC}$, M is the mid point of $\overline{YZ}$,

$\overline{CD} \perp \overline{AB}$ and $\overline{ZL} \perp \overline{XY}$. prove that:

A $\triangle AEC \sim \triangle XMZ$

B $\frac{CD}{ZL} = \frac{AE}{XM}$



- 14 ABC and XYZ are two similar triangles, where, $AB > AC$, $XY > XZ$.

E and L are the mid point of $\overline{BC}$ and $\overline{YZ}$ respectively. $\overline{AF} \perp \overline{BC}$ and $\overline{XM} \perp \overline{YZ}$

Prove that $\triangle AEF \sim \triangle XLM$

- 15 ABC is a triangle, $D \in \overline{BC}$ where $(AD)^2 = BD \times DC$, $BA \times AD = BD \times AC$. Prove that:

A $\triangle ABD \sim \triangle CAD$

B $\overline{AD} \perp \overline{BC}$

C $m(\angle BAC) = 90^\circ$

**Guide Answer – Geometry – Unit 2 – Lesson 2 – Exercise (2– 2)**

Q.	Answer
1)	<i>159 cm</i>
3)	<i>4.4 cm</i>
5)	<i>7cm</i>
7)	<i>35 cm</i>
9)	C

Q.	Answer
2)	<i>3cm</i>
4)	<i>71/7</i>
6)	<i>11.4 cm</i>
8)	<i>5 cm</i>
10)	<i>a.36 cm</i> <i>b. x =20 cm</i> <i>y =15 cm</i>



2 - 3

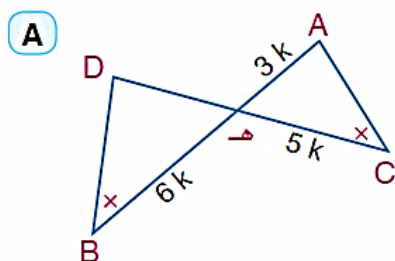
The Relation between the Areas of two Similar Polygons

1 Complete:

A If $\triangle ABC \sim \triangle XYZ$, and $AB = 3 XY$, then $\frac{\text{area}(\triangle XYZ)}{\text{area}(\triangle ABC)} = \dots\dots\dots$

B If $\triangle ABC \sim \triangle DEF$, area of $(\triangle ABC) = 9$ area of $(\triangle DEF)$ and $DE = 4\text{cm}$, then $AB = \dots\dots\dots \text{cm}$

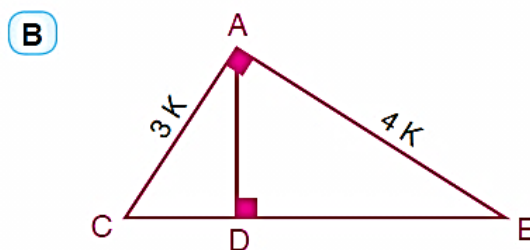
2 Study each of the following figures, where K is constant of proportion, then complete:



$$\overline{AB} \cap \overline{CD} = \{E\}$$

$$\text{area of } (\triangle ACE) = 900 \text{ cm}^2$$

$$\text{then: area of } (\triangle DEB) = \dots\dots\dots \text{ cm}^2$$



$$m(\angle BAC) = 90^\circ, \overline{AD} \perp \overline{BC}$$

$$\text{area of } (\triangle ADC) = 180 \text{ cm}^2 \text{ then:}$$

$$\text{area of } (\triangle ABC) = \dots\dots\dots \text{ cm}^2$$

3 ABC is a triangle, $D \in \overline{AB}$ where $AD = 2 BD$ and $E \in \overline{AC}$ where $\overline{DE} \parallel \overline{BC}$
If the area of $\triangle ADE = 60\text{cm}^2$, find the area of the trapezium DBCE.

.....
.....

4 ABC is a right angled triangle at B. The equilateral triangles ABX, BCY, and ACZ are drawn. prove that : area of $(\triangle ABX) + \text{area of } (\triangle BCY) = \text{area of } (\triangle ACZ)$.

.....
.....



- ⑤ ABC is an inscribed triangle in a circle where $\frac{AB}{BC} = \frac{4}{3}$. from the point B, a tangent is drawn to the circle and intersects $\overrightarrow{AC}$ at E.

prove that: $\frac{\text{area of } (\triangle ABC)}{\text{area of } (\triangle ABE)} = \frac{7}{16}$

.....

.....

- ⑥ ABCD is a parallelogram, $X \in \overrightarrow{AB}$, $X \notin \overline{AB}$, where $BX = 2AB$, $Y \in \overrightarrow{CB}$, $Y \notin \overline{CB}$, where $BY = 2BC$. the parallelogram BXZY is drawn, prove that: $\frac{\text{area of } (ABCD)}{\text{area of } (XBYZ)} = \frac{1}{4}$

.....

.....

- ⑦ ABC is a right angled triangle at B, $\overline{BD} \perp \overline{AC}$ and intersects it at D. The squares AXYB and BMNC are drawn on $\overline{AB}$ and $\overline{BC}$ respectively outside the triangle ABC:

- A** Prove that polygon DAXYB = polygon DBMNC
- B** If $AB = 6\text{cm}$ and $AC = 10\text{cm}$, find the ratio between the areas of the two polygons.

.....

.....

- ⑧ ABC is a triangle, $\overline{AB}$, $\overline{CB}$ and $\overline{AC}$ are corresponding sides to three similar polygons X, Y, Z drawn outside the triangle respectively. If the area of polygon X equals 40 cm^2 , area of polygon Y equals 85 cm^2 and area of polygon Z equals 125 cm^2 . Prove that: the triangle ABC is right angled.

.....

.....

- ⑨ ABCD is a square, $\overline{AB}$, $\overline{BC}$, $\overline{CD}$ and $\overline{DA}$ are divided in the ratio 1 : 3 by the points X, Y, Z and L respectively.

Prove that:

- A** XYZL is a square

B $\frac{\text{Area of the square XYZL}}{\text{Area of the square ABCD}} = \frac{5}{8}$

.....



Guide Answer – Geometry– Unit 2 – Lesson 3 – Exercise (2 – 3)

Q.	Answer
1)	60
3)	60
5)	B
7)	D
9)	B
11)	D
13)	D
15) 1-	$1/9 - 12$

Q.	Answer
2)	6.3
4)	D
6)	361
8)	D
10)	B
12)	D
14)	D
16)	2) a. 1296 b. 90 3) 75



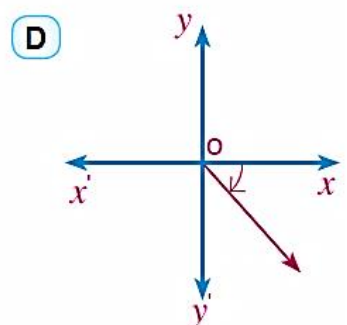
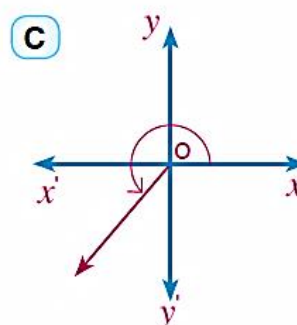
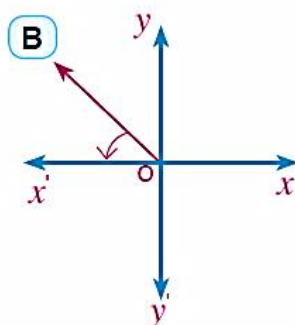
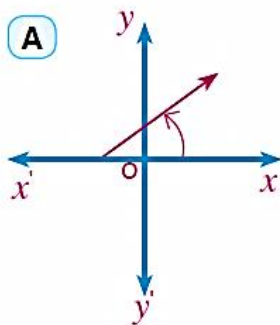
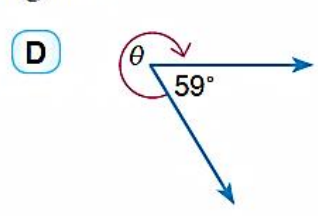
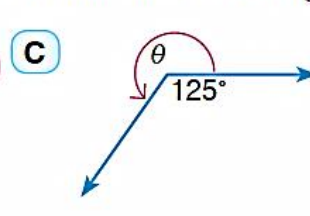
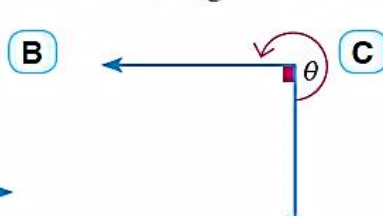
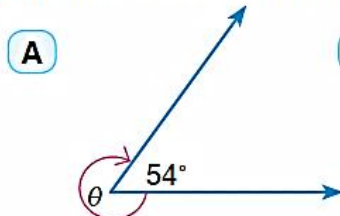
4 - 1

Directed Angle

1 Complete:

- A** A directed angle is in the standard position if
- B** It is said that the directed angles in the standard position are equivalent if
- C** A directed angle is positive, if the rotation of the angle and is negative, if the rotation of the angle
- D** If the terminal side of the directed angle lies on one of the coordinate axes, then it is called
- E** If (θ) is the measure of a directed angle in the standard position and $n \in \mathbb{Z}$, then $(\theta + n \times 360^\circ)$ is called angles.
- F** The smallest positive measure of the angle whose measure 530° is
- G** The angle whose measure 930° lies in the quadrant.
- H** The smallest positive measure of the angle whose measure -690° is

2 Which of the following directed angles is in the standard position

3 Find the measure of the directed angle θ in each of the following figures:

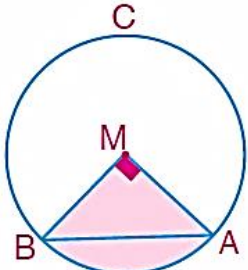


- 9 If the measure of an angle of a triangle equals 75° and the measure of another angle equals $\frac{\pi}{4}$, then the radian measure of the third angle equals.....
- (A) $\frac{\pi}{6}$ (B) $\frac{\pi}{4}$ (C) $\frac{\pi}{3}$ (D) $\frac{5\pi}{12}$

Second: Answer the following questions:

- 10 In terms of π , find the radian measure of the following angles
- (A) 225° (B) 240°
 (C) -135° (D) 300°
 (E) 390° (F) 780°
- 11 Find the radian measure of the following angles approximating the result to the nearest three decimal places:
- (A) 56.6° (B) $25^\circ 18'$ (C) $160^\circ 50' 48''$
- 12 Find the degree measure of the following angles approximating the result to the nearest second:
- (A) 0.49^{rad} (B) 2.27^{rad} (C) $-3\frac{1}{2}^{\text{rad}}$
- 13 θ is a central angle in a circle of radius r and subtends an arc of length L :
- (A) If $r = 20$ cm and $\theta = 78^\circ 15' 20''$ then find L(to the nearest tenth)
 (B) If $L = 27.3$ cm and $\theta = 78^\circ 0' 24''$ then find r(to the nearest tenth)
- 14 A central angle of measure 150° and subtends an arc length 11cm. Calculate its radius length (to the nearest tenth).
-
- 15 Find the radian and degree measure of the central angle which subtends an arc length 8.7cm in a circle of radius length 4cm.....



- 16 **Geometry:** the measure of an angle of a triangle is 60° and the measure of another angle is $\frac{\pi}{4}$. Find the radian measure and the degree measure of the third angle.
- 17 **Geometry:** the radius length of a circle equals 4 cm. The inscribed angle $\angle ABC$ of measure 30° is drawn in it. Find the length of the smaller arc $\widehat{AC}$
- 18 **Geometry:** In the figure opposite: if the area of the right angled triangle MAB at M equals 32 cm^2 , then find the perimeter of the coloured figure to the nearest hundredth.
- 
- 19 **Geometry:** the diameter length in a circle equals 24cm and the chord $\overline{AC}$ is drawn such that $m(\angle BAC) = 50^\circ$. Find the length of the smaller arc $\widehat{AC}$ approximating the result to the nearest hundredth.
- 20 **Distances:** What is the distance covered by the point on the end of the minute hand in 10 minutes, if the hand length is 6cm?
.....
- 21 **Astronomy:** A satellite revolves around the Earth in a circular path way a full revolution every 6 hours. If the radius length of its path way equals 9000km, then find its speed in km/h



Trigonometric Functions

4 - 3

First: Multiple Choice:

- 1 If θ is an angle in the standard position and its terminal side passes through the point $(\frac{1}{2}, \frac{\sqrt{3}}{2})$, then $\sin \theta$ equals:
 (A) $\frac{1}{2}$ (B) $\frac{1}{\sqrt{3}}$ (C) $\frac{\sqrt{3}}{2}$ (D) $\frac{2}{\sqrt{3}}$
- 2 If $\sin \theta = \frac{1}{2}$ where θ is an acute angle, then $m(\angle \theta)$ equals
 (A) 30° (B) 45° (C) 60° (D) 90°
- 3 If $\sin \theta = -1$, $\cos \theta = 0$, then the measure of angle θ equals
 (A) $\frac{\pi}{2}$ (B) π (C) $\frac{3\pi}{2}$ (D) 2π
- 4 If $\csc \theta = 2$ where θ is the measure of an acute angle, then measure of angle θ equals
 (A) 15° (B) 30° (C) 45° (D) 60°
- 5 If $\cos \theta = \frac{1}{2}$, $\sin \theta = -\frac{\sqrt{3}}{2}$, then measure of angle θ equals
 (A) $\frac{2\pi}{3}$ (B) $\frac{5\pi}{6}$ (C) $\frac{5\pi}{3}$ (D) $\frac{11\pi}{6}$
- 6 If $\tan \theta = 1$ where θ is a positive acute angle, then measure of angle θ equals
 (A) 10° (B) 30° (C) 45° (D) 60°
- 7 $\tan 45^\circ + \cot 45^\circ - \sec 60^\circ$ equals
 (A) Zero (B) $\frac{1}{2}$ (C) $\frac{\sqrt{3}}{2}$ (D) 1
- 8 If $\cos \theta = \frac{\sqrt{3}}{2}$ where θ is an acute angle, then $\sin \theta$ equals
 (A) $\frac{1}{2}$ (B) $\frac{1}{\sqrt{3}}$ (C) $\frac{2}{\sqrt{3}}$ (D) $\frac{\sqrt{3}}{2}$

**Second: Answer the following questions:**

- 9 Find all trigonometric functions of angle θ drawn in the standard position and its terminal side intersects the unit circle and passes through each of the following points.

A $(\frac{2}{3}, \frac{\sqrt{5}}{3})$

B $(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})$

C $(\frac{\sqrt{3}}{2}, \frac{1}{2})$

D $(-\frac{3}{5}, -\frac{4}{5})$

- 10 If θ is the measure of the directed angle in the standard position and its terminal side intersects the unit circle at the given point, find all trigonometric function of the angle θ in each of the following cases :

A $(3a, -4a)$ where $a > 0$

B $(\frac{3}{2}a, -2a)$ where $\frac{3\pi}{2} < \theta < 2\pi$

- 11 Determine the sign of each of the following trigonometric function:

A $\sin 240^\circ$

B $\tan 365^\circ$

C $\csc 410^\circ$

D $\cot \frac{9\pi}{4}$

E $\sec -\frac{9\pi}{4}$

F $\tan \frac{-20\pi}{9}$

- 12 Find the value of each of the following:

A $\cos \frac{\pi}{2} \times \cos 0 + \sin \frac{3\pi}{2} \times \sin \frac{\pi}{2}$

B $\tan^2 30^\circ + 2 \sin^2 45^\circ + \cos^2 90^\circ$

حمل الآن

مجاناً وحصرياً

المراجعة رقم (3)

اختبار شهر اكتوبر



Sec [1] - First Term - Algebra - Unit [1] : Relations And Functions

Lesson [1] : An Introduction In Complex Numbers

The imaginary number "i"

The imaginary number "i" is defined as the number whose square is -1

i.e. $i^2 = -1$

Thus we can solve the equation : $x^2 = -1$ as follows :

$$\therefore x^2 = -1$$

$$\therefore x^2 = i^2$$

$$\therefore x = \pm \sqrt{i^2}$$

$$\therefore x = \pm i$$

$$\therefore \text{The solution set} = \{i, -i\}$$

Notice that

- $i \times i = i^2 = -1$
- $-i \times -i = i^2 = -1$

Remarks

- ▶ The number "i" does not belong to the set of real numbers.

i.e. $i \notin \mathbb{R}$, so it will not be represented by a point on the real number line.

- ▶ The numbers $3i, -2i, \sqrt{5}i, \dots$ are imaginary numbers.

- ▶ If a is a real positive number, then $\sqrt{-a} = \sqrt{a}i$

For example :

$$\sqrt{-2} = \sqrt{2i^2} = \sqrt{2}i, \quad \sqrt{-3} = \sqrt{3i^2} = \sqrt{3}i, \quad \sqrt{-25} = \sqrt{25i^2} = 5i \text{ and so on } \dots$$

Integer powers of "i"

The number "i" satisfies the rules of powers that you have studied in the preparatory stage and since $i^2 = -1$, then :

$$\bullet i^3 = i^2 \times i = -1 \times i = -i$$

$$\bullet i^4 = i^2 \times i^2 = -1 \times -1 = 1$$

$$\bullet i^5 = i^4 \times i = 1 \times i = i$$

$$\bullet i^6 = i^4 \times i^2 = 1 \times -1 = -1 \text{ and so on.}$$

From this we find that :

- ▶ The integer powers of "i" give one of the values $i, -1, -i$ or 1
- ▶ These values are repeated if the power is increased by 4

Remark

We can express "1" using the imaginary number i to integer powers from the multiples of 4, and this helps in simplifying some of imaginary numbers, For example : $i^{-19} = \frac{1}{i^{19}} = \frac{i^{20}}{i^{19}} = i$

The complex number

The complex number is the number that can be written in the form $a + bi$

, where a and b are two real numbers and $i^2 = -1$

- a is called the real part.
- b is called the imaginary part.

Examples for complex numbers : $2 - i$, $7 + 13i$, $5i - 4$, $\sqrt{2} + \sqrt{3}i$

Remarks

For any complex number $Z = a + bi$, then :

- ① If $b = 0$, then $Z = a$ and we say that Z is a real number.

Such as $Z = 5$ is a real number and it is a complex number whose imaginary number = 0

- ② If $a = 0$, then $Z = bi$ and we say that Z is an imaginary number. (where $b \neq 0$)

Such as $Z = 2i$ is an imaginary number and it is a complex number.

From the previous , every real number is a complex number whose imaginary number = zero and so the set of real numbers is a subset of set of complex numbers that can be defined as the following.

The set of complex numbers

The set of complex numbers $\mathbb{C}$ is defined as $\mathbb{C} = \{a + bi : a \in \mathbb{R} , b \in \mathbb{R} , i^2 = -1\}$

Equality of two complex numbers

Two complex numbers are equal if and only if the two real parts are equal and the two imaginary parts are equal.

i.e. If $(a + bi)$ and $(c + di)$ are two complex numbers and if $a = c$, $b = d$
 , then $a + bi = c + di$

and vice versa If $a + bi = c + di$, then $a = c$, $b = d$

Notice that Order in complex numbers whose imaginary part not equal to zero has no meaning , we do not know which is greater $(5 + 3i)$ or $(-4 + 7i)$?

Adding and subtracting complex numbers

- When adding or subtracting two complex numbers , we add or subtract real parts together and add or subtract imaginary parts together.

Multiplying complex numbers

Two complex numbers can be multiplied just as the algebraic expressions , considering $i^2 = -1$

Remark

$$(1 \pm i)^{2n} = (\pm 2i)^n \text{ where } n \in \mathbb{Z}$$

• **Proof :** $(1 \pm i)^{2n} = [(1 \pm i)^2]^n = [1 \pm 2i - 1]^n = (\pm 2i)^n$

• This remark is used to simplify some complex numbers as the following :

1 $(1 + i)^{200} = (2i)^{100} = 2^{100} i^{100} = 2^{100}$

2 $(3 - 3i)^4 = 3^4 (1 - i)^4 = 3^4 (-2i)^2 = 3^4 \times 2^2 i^2 = -324$

The two conjugate numbers

The two numbers $a + bi$ and $a - bi$ are called conjugate numbers.

Note : Take care that the complex number and its conjugate differ only in the sign of their imaginary parts.

For example : The two numbers $3 + 4i$, $3 - 4i$ are conjugate numbers.

Remarks

- ▶ The conjugate of the number $2i - 5$ is the number $-2i - 5$ not $2i + 5$
- ▶ The conjugate of the number $2i$ is $-2i$
- ▶ The conjugate of the number 3 is 3
- ▶ The sum of the two conjugate numbers is always a real number , and the product of the two conjugate numbers is always a real number.

For example The complex number $3 + 4i$ its conjugate is $3 - 4i$, then :

* Their sum $= (3 + 4i) + (3 - 4i) = (3 + 3) + (4i - 4i) = 6 \in \mathbb{R}$

* Their product $= (3 + 4i)(3 - 4i) = 9 - 16i^2 = 9 + 16 = 25 \in \mathbb{R}$

[B] Essay problems : -

1

Find the result of each of the following in the simplest form :

(1) $(2 + \sqrt{-9})(3 - 4i)$

(6) $(1 - i)^{10}$

2

Put each of the following in the form $(a + bi)$ where a and b are real numbers :

(2) $\frac{26}{3 - 2i}$

(3) $\frac{2 - 3i}{3 + i}$

(4) $\frac{3 + 4i}{5 - 2i}$

(6) $\frac{(3 + i)(3 - i)}{3 - 4i}$

3

Find the values of x and y that satisfy each of the following equations :

$$(1) \text{ (1) } (2x - 3) + (3y + 1)i = 7 + 10i \quad | \quad (2) \text{ (2) } (2x - y) + (x - 2y)i = 5 + i$$

4

Solve each of the following equations in the set of complex numbers :

$$(1) 3x^2 + 12 = 0$$

$$(2) 4x^2 + 100 = 75$$

$$(3) x^2 - 4x + 5 = 0$$

$$(4) 2x^2 + 6x + 5 = 0$$

Exercises

[A] Choose the correct : -

1

Which of the following is an imaginary number ?

- (a) π (b) $\sqrt{5}$ (c) $\sqrt{-5}$ (d) i^2

2

$$i^{24} = \dots\dots\dots$$

- (a) -1 (b) i^9 (c) $-i$ (d) 1

3

The simplest form of the imaginary number i^{45} is

- (a) i (b) -1 (c) $-i$ (d) 1

4

$$i^{-30} = \dots\dots\dots$$

- (a) 1 (b) -1 (c) $-i$ (d) i

5

The simplest form of the expression $i^{-45} = \dots\dots\dots$

- (a) 1 (b) -1 (c) i (d) $-i$

6

$$\frac{1}{i^{199}} = \dots\dots\dots$$

- (a) 1 (b) $-i$ (c) i (d) -1

7

$$i^{26} + i^{28} = \dots\dots\dots$$

- (a) i^{54} (b) $-i$ (c) zero (d) 2

8

$$\frac{1}{i^{15}} + i^{21} = \dots\dots\dots$$

- (a) zero (b) $2i$ (c) $-2i$ (d) $-i$

9	$5i^7 + 4i^{-1} = \dots\dots\dots$ (a) $9i$ (b) $-9i$ (c) i (d) $-i$
10	$1 + i + i^2 + i^3 + i^4 = \dots\dots\dots$ (a) $4i + 1$ (b) -1 (c) 1 (d) 5
11	If $n \in \mathbb{Z}$, then $i^{8n-3} = \dots\dots\dots$ (a) i (b) $-i$ (c) -1 (d) 1
12	If $n \in \mathbb{Z}$, then $i^{-8n} = \dots\dots\dots$ (a) $\frac{1}{i}$ (b) -1 (c) 1 (d) i
13	If $n \in \mathbb{Z}$, then $i^{4n+42} = \dots\dots\dots$ (a) 1 (b) -1 (c) $-i$ (d) i
14	The additive inverse of the complex number $(4 - 7i)$ is $\dots\dots\dots$ (a) $4 + 7i$ (b) $-4 + 7i$ (c) $-4 - 7i$ (d) $4 - 7i$
15	The conjugate of the number $(3i - 4)$ is $\dots\dots\dots$ (a) $3i + 4$ (b) $-3i - 4$ (c) $-3i + 4$ (d) $3i - 4$
16	The conjugate of the number $(i - i^2)$ is $\dots\dots\dots$ (a) $1 - i$ (b) $1 + i$ (c) $-i - 1$ (d) $i - 1$
17	The conjugate of the number (-8) is $\dots\dots\dots$ (a) $8i$ (b) $-8i$ (c) -8 (d) 8
18	The conjugate of the number $(2 + i)^2$ is $\dots\dots\dots$ (a) $2 + i$ (b) $(2 + i)^{-1}$ (c) $3 + 4i$ (d) $3 - 4i$
19	$\sqrt{-16} = \dots\dots\dots$ (a) -4 (b) 4 (c) $2i$ (d) $4i$
20	$\sqrt{2} \times \sqrt{-8} = \dots\dots\dots$ (a) i (b) $-2i$ (c) $4i$ (d) $-4i$

21	$\sqrt{-18} \times \sqrt{-12} = \dots\dots\dots$ (a) $6\sqrt{6}i$ (b) $6\sqrt{6}$ (c) $-6\sqrt{6}$ (d) $-6\sqrt{6}i$
22	$(-4i)(-6i) = \dots\dots\dots$ (a) $-10i$ (b) $24i$ (c) $-24i$ (d) -24
23	$3i(-2i) = \dots\dots\dots$ (a) $6i$ (b) 6 (c) -6 (d) $-6i$
24	$(-2i)^3(-3i)^2 = \dots\dots\dots$ (a) $-72i$ (b) $72i$ (c) 72 (d) -72
25	$(3+2i) + (2-5i) = \dots\dots\dots$ (a) $5+2i$ (b) $5-3i$ (c) $3-5i$ (d) $5+3i$
26	If $(2+5i) - (4-2i) = x + yi$, then $x + y = \dots\dots\dots$ (a) 9 (b) -1 (c) 1 (d) 5
27	$(12-5i^{17}) - (7-\sqrt{-81}) = \dots\dots\dots$ (a) $5-4i$ (b) $-5+4i$ (c) $5+4i$ (d) $-5-4i$
28	$2 - (1-2i) + (4-5i) - (1-3i) = \dots\dots\dots$ (a) $4i$ (b) $-5i$ (c) $7i$ (d) 4
29	$(4-3i)(4+3i) = \dots\dots\dots$ (a) $25i$ (b) 14 (c) $14i$ (d) 25
30	If $(1+i^4)(1-i^7) = x + yi$, then $x + y = \dots\dots\dots$ (a) 4 (b) 3 (c) 2 (d) 1
31	If x, y are real numbers and $x + yi = i^{43} + 3\sqrt{-4}$, then $x + y = \dots\dots\dots$ (a) 3 (b) 5 (c) $3+2i$ (d) $5i$

32	If $x + yi = (3 + 2i) + (2 - i)$, then $(x, y) = \dots\dots\dots$ (a) (1, 5) (b) (-5, 1) (c) (1, -5) (d) (5, 1)
33	If $x + yi = (2 - 3i)^2$, then $x + y = \dots\dots\dots$ (a) -5 - 12i (b) -17 (c) 17 (d) 60
34	If $x + yi = \frac{1}{i}$ where $x, y \in \mathbb{R}$, then $x + y = \dots\dots\dots$ (a) zero (b) 1 (c) -1 (d) 2
35	If $12 + 3ai = 4b - 27i$, then $a + b = \dots\dots\dots$ (a) -9 (b) 12 (c) -6 (d) 6
36	If $3x - 2yi = (5 - 2i)^2$, then $y - x = \dots\dots\dots$ (a) 17 (b) -3 (c) 3 (d) 21 - 20i
37	The solution set of the equation : $x^2 + 4 = 0$ in the set of complex numbers is (a) {2} (b) {-2} (c) $\emptyset$ (d) {2i, -2i}
38	The solution set of the equation : $9x^2 + 4 = 0$ in the set of complex numbers is (a) $\{-\frac{2}{3}\}$ (b) $\{-\frac{2}{3}, \frac{2}{3}\}$ (c) $\{\frac{2}{3}\}$ (d) $\{-\frac{2}{3}i, \frac{2}{3}i\}$

Exercises

[A] Choose the correct : -

1	$i^{-30} = \dots\dots\dots$ (a) 1 (b) -1 (c) -i (d) i
2	$i^{26} + i^{28} = \dots\dots\dots$ (a) i^{54} (b) -i (c) zero (d) 2
3	$1 + i + i^2 + i^3 + i^4 = \dots\dots\dots$ (a) $4i + 1$ (b) -1 (c) 1 (d) 5

4	If $n \in \mathbb{Z}$, then $i^{4n+42} = \dots\dots\dots$ (a) 1 (b) -1 (c) -i (d) i	
5	The conjugate of the number $(i - i^2)$ is $\dots\dots\dots$ (a) $1 - i$ (b) $1 + i$ (c) $-i - 1$ (d) $i - 1$	
6	$\sqrt{-16} = \dots\dots\dots$ (a) -4 (b) 4 (c) $2i$ (d) $4i$	
7	 $(-4i)(-6i) = \dots\dots\dots$ (a) $-10i$ (b) $24i$ (c) $-24i$ (d) -24	
8	 $(3 + 2i) + (2 - 5i) = \dots\dots\dots$ (a) $5 + 2i$ (b) $5 - 3i$ (c) $3 - 5i$ (d) $5 + 3i$	
9	Which of the following is an imaginary number ? (a) π (b) $\sqrt{5}$ (c) $\sqrt{-5}$ (d) i^2	
10	$2 - (1 - 2i) + (4 - 5i) - (1 - 3i) = \dots\dots\dots$ (a) $4i$ (b) $-5i$ (c) $7i$ (d) 4	
11	If x, y are real numbers and $x + yi = i^{43} + 3\sqrt{-4}$, then $x + y = \dots\dots\dots$ (a) 3 (b) 5 (c) $3 + 2i$ (d) $5i$	
12	If $x + yi = \frac{1}{i}$ where $x, y \in \mathbb{R}$, then $x + y = \dots\dots\dots$ (a) zero (b) 1 (c) -1 (d) 2	
13	The solution set of the equation : $x^2 + 4 = 0$ in the set of complex numbers is $\dots\dots\dots$ (a) $\{2\}$ (b) $\{-2\}$ (c) $\emptyset$ (d) $\{2i, -2i\}$	
14	If $x^2 - 2x + 2 = 0$, then $x = \dots\dots\dots$ (a) $2 \pm 2i$ (b) $2 \pm i$ (c) $1 \pm i$ (d) $1 \pm 2i$	
15	$i^{24} = \dots\dots\dots$ (a) -1 (b) i^9 (c) -i (d) 1	

16	The simplest form of the expression $i^{-45} = \dots\dots\dots$ (a) 1 (b) -1 (c) i (d) $-i$	
17	$\frac{1}{i^{15}} + i^{21} = \dots\dots\dots$ (a) zero (b) $2i$ (c) $-2i$ (d) $-i$	
18	If $n \in \mathbb{Z}$, then $i^{8n-3} = \dots\dots\dots$ (a) i (b) $-i$ (c) -1 (d) 1	
19	The additive inverse of the complex number $(4 - 7i)$ is $\dots\dots\dots$ (a) $4 + 7i$ (b) $-4 + 7i$ (c) $-4 - 7i$ (d) $4 - 7i$	
20	The conjugate of the number (-8) is $\dots\dots\dots$ (a) $8i$ (b) $-8i$ (c) -8 (d) 8	
21	$\sqrt{2} \times \sqrt{-8} = \dots\dots\dots$ (a) i (b) $-2i$ (c) $4i$ (d) $-4i$	
22	 $3i(-2i) = \dots\dots\dots$ (a) $6i$ (b) 6 (c) -6 (d) $-6i$	
23	If $(2 + 5i) - (4 - 2i) = x + yi$, then $x + y = \dots\dots\dots$ (a) 9 (b) -1 (c) 1 (d) 5	
24	$(4 - 3i)(4 + 3i) = \dots\dots\dots$ (a) $25i$ (b) 14 (c) $14i$ (d) 25	
25	If $x + yi = (3 + 2i) + (2 - i)$, then $(x, y) = \dots\dots\dots$ (a) $(1, 5)$ (b) $(-5, 1)$ (c) $(1, -5)$ (d) $(5, 1)$	
26	If $12 + 3ai = 4b - 27i$, then $a + b = \dots\dots\dots$ (a) -9 (b) 12 (c) -6 (d) 6	

27	The solution set of the equation : $9x^2 + 4 = 0$ in the set of complex numbers is	
	(a) $\left\{\frac{-2}{3}\right\}$ (b) $\left\{\frac{-2}{3}, \frac{2}{3}\right\}$ (c) $\left\{\frac{2}{3}\right\}$ (d) $\left\{\frac{-2}{3}i, \frac{2}{3}i\right\}$	
28	The simplest form of the imaginary number i^{45} is	
	(a) i (b) -1 (c) $-i$ (d) 1	
29	$\frac{1}{i^{199}} = \dots\dots\dots$	
	(a) 1 (b) $-i$ (c) i (d) -1	
30	$5i^7 + 4i^{-1} = \dots\dots\dots$	
	(a) $9i$ (b) $-9i$ (c) i (d) $-i$	
31	If $n \in \mathbb{Z}$, then $i^{-8n} = \dots\dots\dots$	
	(a) $\frac{1}{i}$ (b) -1 (c) 1 (d) i	
32	The conjugate of the number $(3i - 4)$ is	
	(a) $3i + 4$ (b) $-3i - 4$ (c) $-3i + 4$ (d) $3i - 4$	
33	The conjugate of the number $(2 + i)^2$ is	
	(a) $2 + i$ (b) $(2 + i)^{-1}$ (c) $3 + 4i$ (d) $3 - 4i$	
34	 $\sqrt{-18} \times \sqrt{-12} = \dots\dots\dots$	
	(a) $6\sqrt{6}i$ (b) $6\sqrt{6}$ (c) $-6\sqrt{6}$ (d) $-6\sqrt{6}i$	
35	 $(-2i)^3 (-3i)^2 = \dots\dots\dots$	
	(a) $-72i$ (b) $72i$ (c) 72 (d) -72	
36	$(12 - 5i^{17}) - (7 - \sqrt{-81}) = \dots\dots\dots$	
	(a) $5 - 4i$ (b) $-5 + 4i$ (c) $5 + 4i$ (d) $-5 - 4i$	
37	If $(1 + i^4)(1 - i^7) = x + yi$, then $x + y = \dots\dots\dots$	
	(a) 4 (b) 3 (c) 2 (d) 1	

38	If $X + y i = (2 - 3 i)^2$, then $X + y = \dots\dots\dots$ (a) $-5 - 12 i$ (b) -17 (c) 17 (d) 60	
39	If $3 X - 2 y i = (5 - 2 i)^2$, then $y - X = \dots\dots\dots$ (a) 17 (b) -3 (c) 3 (d) $21 - 20 i$	
40	If $X - 2 i = 3 + y i$, then the conjugate of the number $X + y i$ is $\dots\dots\dots$ (a) $3 - 2 i$ (b) $3 + 2 i$ (c) $-3 - 2 i$ (d) $-3 + 2 i$	

[B] Essay problems : -

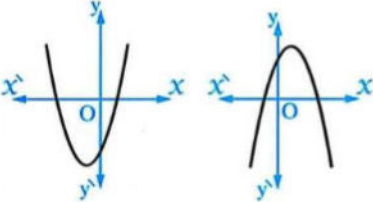
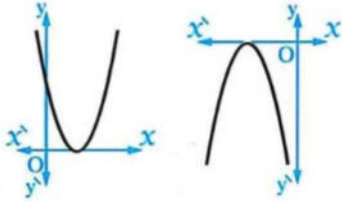
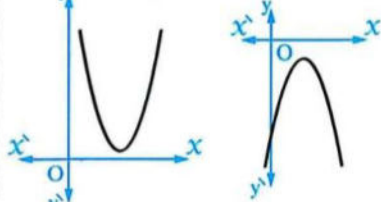
1	Find the values of X and y that satisfy each of the following equations : (1) $(2 X - 3) + (3 y + 1) i = 7 + 10 i$ (2) $(2 X - y) + (X - 2 y) i = 5 + i$
2	Find the result of each of the following in the simplest form : $(1 - i)^{10}$
3	Find the result of each of the following in the simplest form : $(2 + \sqrt{-9})(3 - 4 i)$
4	Put each of the following in the form $(a + b i)$ where a and b are real numbers : (1) $\frac{4 - 5 i}{7 i}$ (2) $\frac{26}{3 - 2 i}$ (3) $\frac{2 - 3 i}{3 + i}$ (4) $\frac{3 + 4 i}{5 - 2 i}$ (6) $\frac{(3 + i)(3 - i)}{3 - 4 i}$
5	Solve each of the following equations in the set of complex numbers : (1) $3 X^2 + 12 = 0$ (2) $4 X^2 + 100 = 75$ (3) $X^2 - 4 X + 5 = 0$ (4) $2 X^2 + 6 X + 5 = 0$

Sec [1] - First Term - Algebra - Unit [1] : Relations And Functions

Lesson [2] : Determining The Types Of Roots Of A Quadratic Equation

Discriminant

- Using the formula in solving the quadratic equation : $aX^2 + bX + c = 0$, where $a \neq 0$, we get two roots : $\frac{-b + \sqrt{b^2 - 4ac}}{2a}$, $\frac{-b - \sqrt{b^2 - 4ac}}{2a}$
- Both of these two roots include the expression : $\sqrt{b^2 - 4ac}$
- The expression : $b^2 - 4ac$ is called the discriminant of the quadratic equation because it is used to determine the types of roots of the quadratic equation as follows :

A sketch for the function related to the equation Discriminant Type of the two roots	positive $(b^2 - 4ac) > 0$	equal to zero $b^2 - 4ac = 0$	negative $(b^2 - 4ac) < 0$
	Two different real roots	Two equal real roots	Two complex and non real roots
			

Remark

If the coefficients a , b and c in the quadratic equation : $aX^2 + bX + c = 0$ are rational numbers and the discriminant is a perfect square , then the roots are real rational numbers.

Remark

If the discriminant of the quadratic equation (of real coefficients) isn't positive , then the two roots of the quadratic equation are two conjugate complex numbers.

[B] Essay problems : -

Determine the type of the two roots of each of the following equations :

- 1
- | | |
|--|-------------------------------|
| (1) $x^2 - 2x + 5 = 0$ | (2) $x^2 - 10x + 25 = 0$ |
| (3) $-x^2 + 5x - 30 = 0$ | (4) $(x - 11) - x(x - 6) = 0$ |
| (7) $(x - 1)(x - 7) = 2(x - 3)(x - 4)$ | |

If the two roots of each of the following quadratic equations are equal , then find the value of k :

- 2
- (1) $x^2 - 3x + 2 + \frac{1}{k} = 0$ « 4 »
- (3) $x^2 + 2(k - 1)x + (2k + 1) = 0$, then find the two roots. « 0 , 1 , 1 or 4 , -3 , -3 »

- 3
- If L and M are two rational numbers , then prove that the two roots of the equation : $Lx^2 + (L - M)x - M = 0$ are rational numbers.**

Solutions

- 1
- (1) Discriminant $= (-2)^2 - 4 \times 1 \times 5 = -16 < 0$
 $\therefore$ The two roots are complex and not real number.
- (2) Discriminant $= (-10)^2 - 4 \times 1 \times 25 = 0$
 $\therefore$ The two roots are real and equal.
- (3) Discriminant $= (5)^2 - 4 \times (-1) \times (-30) = -95 < 0$
 $\therefore$ The two roots are complex and not real numbers.
- (4) $\therefore x - 11 - x^2 + 6x = 0$
 $\therefore x^2 - 7x + 11 = 0$
 $\therefore$ The discriminant $= (-7)^2 - 4 \times 1 \times 11 = 5 > 0$
 $\therefore$ The two roots are real and different.
- (7) $\therefore (x - 1)(x - 7) = 2(x - 3)(x - 4)$
 $\therefore x^2 - 8x + 7 = 2x^2 - 14x + 24$
 $\therefore x^2 - 6x + 17 = 0$
 $\therefore$ The discriminant $= (-6)^2 - 4 \times 1 \times 17 = -32 < 0$
 $\therefore$ The two roots are complex and not real.

- 2
- (1) $\therefore$ The two roots are equal
 $\therefore$ The discriminant $= 0$
 $\therefore (-3)^2 - 4 \times 1 \times \left(2 + \frac{1}{k}\right) = 0$
 $\therefore 8 + \frac{4}{k} = 9 \quad \therefore \frac{4}{k} = 1 \quad \therefore k = 4$

- (3) $\therefore$ The two roots are equal
 $\therefore$ The discriminant $= 0$
 $\therefore [2(k - 1)]^2 - 4 \times 1 \times (2k + 1) = 0$
 $\therefore 4k^2 - 8k + 4 - 8k - 4 = 0$
 $\therefore 4k^2 - 16k = 0$
 $\therefore 4k(k - 4) = 0 \quad \therefore k = 0 \text{ or } k = 4$
 $\therefore$ The two roots are equal and each of them
 $= \frac{-2k + 2 \pm \sqrt{0}}{2 \times 1} = \frac{-2k + 2}{2} = -k + 1$
 $\therefore$ At $k = 0$, then the two roots are equal and each of them $= 1$
 At $k = 4$, then the two roots are equal and each of them $= -3$

- 3
- $\therefore$ The coefficients are rational numbers
 $\therefore$ The discriminant $= (L - M)^2 - 4 \times L \times -M$
 $= L^2 - 2LM + M^2 + 4LM$
 $= L^2 + 2LM + M^2 = (L + M)^2$ (a perfect square)
 $\therefore$ The two roots are rational.

Exercises

[A] Choose the correct : -

1	The two roots of the equation : $x^2 - 5x + 11 = 0$ are (a) two complex and non real roots. (b) two rational roots. (c) two different real roots. (d) two equal real roots.	
2	The two roots of the equation : $x^2 - 11x + 10 = 0$ are (a) two complex and non real roots. (b) two different real roots. (c) two equal real roots. (d) Two conjugate complex numbers.	
3	The two roots of the equation : $49x^2 - 14x + 1 = 0$ are (a) two different real roots. (b) two equal real roots. (c) two complex and non real roots. (d) two non conjugate complex numbers.	
4	The two roots of the equation : $6x^2 = 19x - 15$ are (a) two non real roots. (b) two equal real roots. (c) two different rational numbers. (d) two conjugate imaginary numbers.	
5	 The two roots of the equation : $x(x - 2) = 5$ are (a) two complex and non real roots. (b) two equal real roots. (c) two different real roots. (d) 2 and zero.	
6	The two roots of the equation : $x + \frac{9}{x} = 6$ are (a) two equal real roots. (b) two complex and non real roots. (c) two different real roots. (d) two equal imaginary numbers.	
7	Number of values of real x which satisfy the equation : $2x^2 - 7x = 5$ is (a) zero (b) 1 (c) 2 (d) 3	

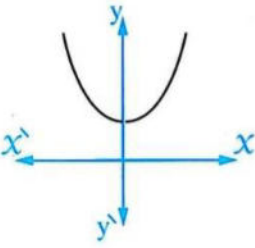
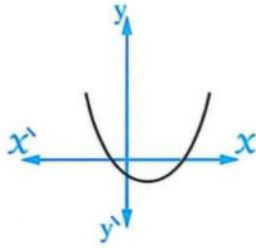
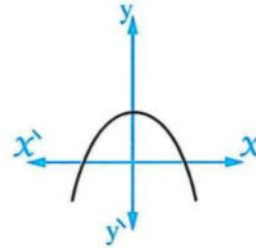
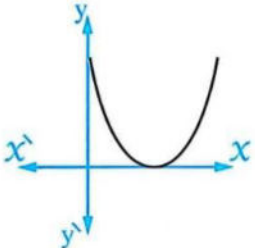
8	The discriminant of the equation : $(x + 2)^2 + 5 = 0$ is (a) perfect square. (b) more than zero. (c) negative number. (d) irrational number.	
9	In the quadratic equation : $b x^2 + a x = c$ the discriminant is (a) $b^2 - 4 a c$ (b) $a^2 + 4 b c$ (c) $b^2 + 4 a c$ (d) $c^2 - 4 a b$	
10	The quadratic equation : $a^2 x^2 + 2 a b x + b^2 = 0$ where $a, b \in \mathbb{R}$ (a) has two different real roots. (b) has two equal real roots. (c) hasn't any real roots. (d) Can't determine the type of its two roots because we don't know the value of a and b	
11	The two roots of the equation : $c x^2 + a x + b = 0$ are two complex and non real roots if (a) $b^2 - 4 a c < 0$ (b) $a^2 - 4 b c < 0$ (c) $c^2 - 4 a b < 0$ (d) $b^2 - 4 a c > 0$	
12	If the two roots of the equation : $a x^2 + b = 0$ are two different real roots , then (a) $a b > 0$ (b) $a = 0$ (c) $a > 0, b > 0$ (d) $a b < 0$	
13	If $a x^2 + b x + c = 0$ and $a c < 0$, then the two roots of the equation are (a) equal real. (b) different real. (c) conjugate complex. (d) rational.	
14	If $a x^2 + b x + c = 0$ is a quadratic equation , then which of the following inequalities does satisfy that the equation has two real roots ? (a) $b^2 + 4 a c \geq 0$ (b) $b^2 - 4 a c < 0$ (c) $b^2 \geq 5 a c$ (d) $b^2 - 4 a c \leq 0$	

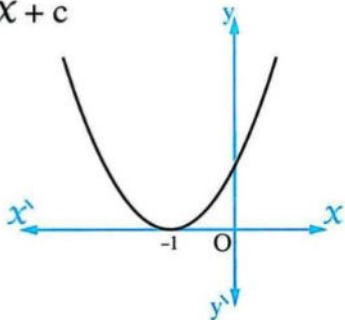
15	If a $X^2 + bX + c = 0$ where a, b, c are rational numbers and $b^2 - 4ac = 25$, then the two roots of the equation are (a) equal real. (b) complex and non real. (c) conjugate complex. (d) different rational.	
16	If the two roots of the equation : $X^2 - kX + 25 = 0$ are equal real roots , then $k = \dots\dots\dots$ (a) 10 (b) - 10 (c) ± 10 (d) - 5	
17	If the two roots of the equation : $18X^2 - kX + 8 = 0$ are equal real roots , then $k = \dots\dots\dots$ (a) zero (b) ± 5 (c) ± 18 (d) ± 24	
18	If the two roots of the equation : $3X^2 - 6X + k = 0$ are equal real roots , then $k = \dots\dots\dots$ (a) 2 (b) 3 (c) 6 (d) 9	
19	If the discriminant of the quadratic equation : $2X^2 + 5X + 4k = 0$ equal zero , then $k \dots\dots\dots$ (a) ± 14 (b) zero (c) $\pm \frac{25}{32}$ (d) $\frac{25}{32}$	
20	If the roots of the equation : $X^2 + 3X - m = 0$ are different real roots , then one of the values of m which satisfy the equation : is $m = \dots\dots\dots$ (a) - 2 (b) - 3 (c) - 4 (d) - 5	
21	If the two roots of the equation : $X^2 - 4X + k = 0$ are real , then $k \in \dots\dots\dots$ (a) $[4, \infty[$ (b) $] - \infty, 4[$ (c) $]4, \infty[$ (d) $] - \infty, 4]$	
22	 If the roots of the equation : $X^2 + 4X + k = 0$ are different real , then (a) $k = 0$ (b) $k < 4$ (c) $k \leq 0$ (d) $k \leq 4$	
23	 If the roots of the equation : $kX^2 - 8X + 16 = 0$ are two complex and non real , then (a) $k > 2$ (b) $k < 2$ (c) $k \in]1, 10[$ (d) $k > 1$	

Homework

[A] Choose the correct : -

1	The two roots of the equation : $x + \frac{9}{x} = 6$ are (a) two equal real roots. (b) two complex and non real roots. (c) two different real roots. (d) two equal imaginary numbers.	
2	The two roots of the equation : $c x^2 + a x + b = 0$ are two complex and non real roots if (a) $b^2 - 4 a c < 0$ (b) $a^2 - 4 b c < 0$ (c) $c^2 - 4 a b < 0$ (d) $b^2 - 4 a c > 0$	
3	If the two roots of the equation : $x^2 - k x + 25 = 0$ are equal real roots , then $k = \dots\dots\dots$ (a) 10 (b) - 10 (c) ± 10 (d) - 5	
4	If the two roots of the equation : $x^2 - 4 x + k = 0$ are real , then $k \in \dots\dots\dots$ (a) $[4, \infty[$ (b) $] - \infty, 4[$ (c) $]4, \infty[$ (d) $] - \infty, 4]$	
5	In the quadratic equation $f(x) = 0$, if the discriminant is negative , then which of the following graphs is the graph of the function $f(x)$? (a) (b) (c) (d)	
6	The roots of the equation : $x^2 = k - 2$ has distinct imaginary roots , then (a) $k > 2$ (b) $k < 2$ (c) $k \geq 2$ (d) $k \leq 2$	

7	The two roots of the equation : $x^2 - 11x + 10 = 0$ are (a) two complex and non real roots. (b) two different real roots. (c) two equal real roots. (d) Two conjugate complex numbers.	
8	Number of values of real x which satisfy the equation : $2x^2 - 7x = 5$ is (a) zero (b) 1 (c) 2 (d) 3	
9	If the two roots of the equation : $ax^2 + b = 0$ are two different real roots , then (a) $ab > 0$ (b) $a = 0$ (c) $a > 0, b > 0$ (d) $ab < 0$	
10	If the two roots of the equation : $18x^2 - kx + 8 = 0$ are equal real roots , then $k =$ (a) zero (b) ± 5 (c) ± 18 (d) ± 24	
11	 If the roots of the equation : $x^2 + 4x + k = 0$ are different real , then (a) $k = 0$ (b) $k < 4$ (c) $k \leq 0$ (d) $k \leq 4$	
12	Each of the following figures represents the curve of the function f : $f(x) = ax^2 + bx + c$ which of these figures does have $b^2 - 4ac = 0$  (a)  (b)  (c)  (d)	
13	If the roots of the equation : $x^2 + kx + k^2 = 0$ are complex and not real , then $k \in$ (a) $\mathbb{R} - \{0\}$ (b) $\mathbb{R}$ (c) $]0, \infty[$ (d) $] - \infty, 0[$	

14	The two roots of the equation : $49x^2 - 14x + 1 = 0$ are (a) two different real roots. (b) two equal real roots. (c) two complex and non real roots. (d) two non conjugate complex numbers.	
15	The discriminant of the equation : $(x + 2)^2 + 5 = 0$ is (a) perfect square. (b) more than zero. (c) negative number. (d) irrational number.	
16	If a $x^2 + bx + c = 0$ is a quadratic equation , then which of the following inequalities does satisfy that the equation has two real roots ? (a) $b^2 + 4ac \geq 0$ (b) $b^2 - 4ac < 0$ (c) $b^2 \geq 5ac$ (d) $b^2 - 4ac \leq 0$	
17	If a $x^2 + bx + c = 0$ and $ac < 0$, then the two roots of the equation are (a) equal real. (b) different real. (c) conjugate complex. (d) rational.	
18	The quadratic equation : $a^2x^2 + 2abx + b^2 = 0$ where $a, b \in \mathbb{R}$ (a) has two different real roots. (b) has two equal real roots. (c) hasn't any real roots. (d) Can't determine the type of its two roots because we don't know the value of a and b	
19	The given figure represents the function $f : f(x) = ax^2 + bx + c$, then $(b^2 - 4ac) \times f(3) = \dots\dots\dots$ (a) 3 (b) -1 (c) -3 (d) zero 	

20	If the curve of the quadratic equation $f : f(x) = x^2 - 2(m - 2)x + m^2 - 8$ touches the x-axis , then m (a) 2 (b) 3 (c) 4 (d) 5	
21	The two roots of the equation : $6x^2 = 19x - 15$ are (a) two non real roots. (b) two equal real roots. (c) two different rational numbers. (d) two conjugate imaginary numbers.	
22	In the quadratic equation : $bx^2 + ax = c$ the discriminant is (a) $b^2 - 4ac$ (b) $a^2 + 4bc$ (c) $b^2 + 4ac$ (d) $c^2 - 4ab$	
23	If the discriminant of the quadratic equation : $2x^2 + 5x + 4k = 0$ equal zero , then k (a) ± 14 (b) zero (c) $\pm \frac{25}{32}$ (d) $\frac{25}{32}$	
24	If the graph of the quadratic function $f : f(x)$ does not intersect the x-axis , then which of the following can be the rule of the function ? (a) $2x^2 + 3x - 5$ (b) $-x^2 + 5x + 1$ (c) $4x^2 - 20x + 25$ (d) $3x^2 - x + 2$	
25	 The two roots of the equation : $x(x - 2) = 5$ are (a) two complex and non real roots. (b) two equal real roots. (c) two different real roots. (d) 2 and zero.	
26	If the two roots of the equation : $3x^2 - 6x + k = 0$ are equal real roots , then $k =$ (a) 2 (b) 3 (c) 6 (d) 9	

27	In the equation : $75x^2 + 7kx + 3 = 0$ if $k \geq 5$, then the two roots of the equation (a) equal real. (b) complex and non real. (c) different rational. (d) different real.	
28	If a $x^2 + bx + c = 0$ where a , b , c are rational numbers and $b^2 - 4ac = 25$, then the two roots of the equation are (a) equal real. (b) complex and non real. (c) conjugate complex. (d) different rational.	
29	If the roots of the equation : $x^2 + 3x - m = 0$ are different real roots , then one of the values of m which satisfy the equation : is m = (a) - 2 (b) - 3 (c) - 4 (d) - 5	
30	 If the roots of the equation : $kx^2 - 8x + 16 = 0$ are two complex and non real , then (a) $k > 2$ (b) $k < 2$ (c) $k \in]1, 10[$ (d) $k > 1$	
31	The two roots of the equation : $x^2 - 5x + 11 = 0$ are (a) two complex and non real roots. (b) two rational roots. (c) two different real roots. (d) two equal real roots.	
32	The curve of the quadratic function $f : f(x) = -ax^2 + bx + c$ is drawn on the cartesian coordinate and the vertex of the curve is (3 , 1) , the curve intersects the x-axis twice where a , b , c are constants which of the following could be a value of c (a) - 8 (b) 2 (c) 3 (d) 7	

[B] Essay problems : -

1

Determine the type of the two roots of each of the following equations :

 $(x - 11) - x(x - 6) = 0$

2

If the two roots of each of the following quadratic equations are equal , then find the value of k :

 $x^2 + 2(k - 1)x + (2k + 1) = 0$, then find the two roots. « 0 , 1 , 1 or 4 , - 3 , - 3 »

3

Determine the type of the two roots of each of the following equations :

 $x^2 - 10x + 25 = 0$

4

Determine the type of the two roots of each of the following equations :

 $x^2 - 2x + 5 = 0$

5

Determine the type of the two roots of each of the following equations :

 $(x - 1)(x - 7) = 2(x - 3)(x - 4)$

6

 If L and M are two rational numbers , then prove that the two roots of the equation : $Lx^2 + (L - M)x - M = 0$ are rational numbers.

7

Determine the type of the two roots of each of the following equations :

 $-x^2 + 5x - 30 = 0$

8

If the two roots of each of the following quadratic equations are equal , then find the value of k :

 $x^2 - 3x + 2 + \frac{1}{k} = 0$ « 4 »

Sec [1] - First Term - Algebra - Unit [1] : Relations And Functions

Lesson [3] : Relation Between The Two Roots

We know that the two roots of the quadratic equation : $aX^2 + bX + c = 0$ are :

i.e. The sum of the two roots = $\frac{-\text{Coefficient of } X}{\text{Coefficient of } X^2}$

i.e. The product of the two roots = $\frac{\text{Absolute term}}{\text{Coefficient of } X^2}$

In a symbolic form , we write :

If L and M are the two roots of the quadratic equation : $aX^2 + bX + c = 0$, then :

1 $L + M = \frac{-b}{a}$

2 $LM = \frac{c}{a}$

Remarks

In the quadratic equation : $aX^2 + bX + c = 0$

1 If $a = 1$, then $L + M = -b$ and $LM = c$

i.e. The sum of the two roots = the additive inverse of the coefficient of X ,
the product of the two roots = the absolute term.

2 If $b = 0$, then $L + M = 0$, **i.e.** $L = -M$

i.e. One of the two roots of the equation is the additive inverse of the other.

3 If $a = c$, then $LM = 1$, **i.e.** $L = \frac{1}{M}$

i.e. One of the two roots of the equation is the multiplicative inverse of the other.

Remarks

1 If one root is additive inverse then : $B = 0$

2 If one root is multiplicative inverse then : $A = C$

[B] Essay problems : -

1	Without solving the equation , find the sum and the product of the two roots of each of the following equations : (1) $3x^2 = 23x - 30$
2	If the product of the two roots of the equation : $3x^2 + 10x - c = 0$ is $-\frac{8}{3}$, find the value of c , then solve the equation in the set of complex numbers. « $c = 8$, $x = \frac{2}{3}$ or $x = -4$ »
3	If the sum of the two roots of the equation : $2x^2 + bx - 5 = 0$ is $-\frac{3}{2}$, find the value of b , then solve the equation in the set of complex numbers. « $b = 3$, $x = -\frac{5}{2}$ or $x = 1$ »
4	Find the other root of the equation , then find the value of a in each of the following where $a \in \mathbb{R}$: (1) If $x = -1$ is one of the two roots of the equation : $x^2 - 2x + a = 0$ « 3 , -3 » (2) If $x = \frac{1}{2}$ is one of the two roots of the equation : $2x^2 - ax + 3 = 0$ « 3 , 7 » (3) If $(1 + i)$ is one of the two roots of the equation : $x^2 - 2x + a = 0$ « $1 - i$, 2 »
5	Find the values of a , b in each of the following equations , if : (1) 2 , 5 are the two roots of the equation : $x^2 + ax + b = 0$ « $a = -7$, $b = 10$ » (2) -3 , 7 are the two roots of the equation : $ax^2 - bx - 21 = 0$ « $a = 1$, $b = 4$ »
6	Find the value of k in each of the following which makes : (1) One of the roots of the equation : $x^2 + (k - 1)x - 3 = 0$ is the additive inverse of the other roots. « 1 » (2) One of the roots of the equation : $(k - 2)x^2 + (k - 3)x - 4 = 0$ is the multiplicative inverse of the other root. « -2 » (3) One of the roots of the equation : $4kx^2 + 7x + k^2 + 4 = 0$ is the multiplicative inverse of the other. « 2 »

Solutions

1	$\therefore 3x^2 - 23x + 30 = 0$ $\therefore$ The sum of the two roots $= \frac{23}{3}$ $\therefore$ their product $= 10$
2	$\therefore$ The product of the two roots $= \frac{c}{a}$ $\therefore \frac{-c}{3} = \frac{-8}{3} \quad \therefore c = 8$ $\therefore 3x^2 + 10x - 8 = 0 \quad \therefore (3x - 2)(x + 4) = 0$ $\therefore x = \frac{2}{3}$ or $x = -4$
3	$\therefore$ The sum of the two roots $= \frac{-b}{a}$ $\therefore \frac{-b}{2} = \frac{-3}{2} \quad \therefore b = 3$ $\therefore 2x^2 + 3x - 5 = 0$ $\therefore (2x + 5)(x - 1) = 0 \quad \therefore x = \frac{-5}{2}$ or $x = 1$
4	(1) $\therefore$ The sum of the two roots $= \frac{-\text{coefficient of } x}{\text{coefficient of } x^2} = 2$ $\therefore -1 + \text{the other root} = 2$ $\therefore$ The other root $= 3$ $\therefore$ The product of the two roots $= \frac{\text{the absolute term}}{\text{coefficient of } x^2} = a$ $\therefore -1 \times 3 = a \quad \therefore a = -3$ (2) $\therefore$ The product of the two roots $= \frac{\text{the absolute term}}{\text{coefficient of } x^2}$ $= \frac{3}{2}$ $\therefore \frac{1}{2} \times \text{the other root} = \frac{3}{2} \quad \therefore$ The other root $= 3$ $\therefore$ The sum of the two roots $= \frac{-\text{coefficient of } x}{\text{coefficient of } x^2} = \frac{a}{2}$ $\therefore \frac{1}{2} + 3 = \frac{a}{2} \quad \therefore a = 7$
5	(1) $\therefore$ The sum of the two roots $= \frac{-\text{coefficient of } x}{\text{coefficient of } x^2} = -a$ $\therefore 2 + 5 = -a \quad \therefore a = -7$ $\therefore$ The product of the two roots $= \frac{\text{the absolute term}}{\text{coefficient of } x^2} = b$ $\therefore 2 \times 5 = b \quad \therefore b = 10$ (2) $\therefore$ The product of the two roots $= \frac{\text{the absolute term}}{\text{coefficient of } x^2}$ $= \frac{-21}{a}$ $\therefore -3 \times 7 = \frac{-21}{a} \quad \therefore a = 1$ $\therefore$ The sum of the two roots $= \frac{-\text{coefficient of } x}{\text{coefficient of } x^2} = b$ $\therefore -3 + 7 = b \quad \therefore b = 4$
6	(1) $\therefore$ One of the two roots is the additive inverse of the other. $\therefore k - 1 = 0 \quad \therefore k = 1$ (2) $\therefore$ One of the two roots is the multiplicative inverse of the other. $\therefore k - 2 = -4 \quad \therefore k = -2$ (3) $\therefore$ One of the two roots is the multiplicative inverse of the other. $\therefore 4k = k^2 + 4 \quad \therefore k^2 - 4k + 4 = 0$ $\therefore (k - 2)^2 = 0 \quad \therefore k = 2$

Exercises

[A] Choose the correct : -

1	The sum of the two roots of the equation : $x^2 + 3x - 10 = 0$ is (a) 10 (b) - 10 (c) 3 (d) - 3	
1	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
2	The sum of the two roots of the equation : $4x^2 + 4x - 35 = 0$ is (a) - 1 (b) - 4 (c) 1 (d) $-\frac{35}{4}$	
2	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
3	The sum of the two roots of the equation : $5x^2 - 3 = 0$ is (a) $\frac{3}{5}$ (b) $-\frac{3}{5}$ (c) zero (d) $\frac{5}{3}$	
3	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
4	The product of the two roots of the equation : $x^2 - 5x + 6 = 0$ is (a) - 6 (b) 5 (c) - 5 (d) 6	
4	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
5	The product of the two roots of the equation : $2x^2 - 7x - 6 = 0$ equal (a) - 6 (b) $\frac{7}{2}$ (c) 3 (d) - 3	
5	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	

6	The product of the two roots of the equation : $3 + 2x - \frac{1}{4}x^2 = 0$ equals (a) $-\frac{2}{3}$ (b) 12 (c) -12 (d) $\frac{3}{4}$	
6	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
7	The product of the two roots of the equation : $bx^2 + cx + a = 0$ equals (a) $-\frac{c}{a}$ (b) $\frac{a}{b}$ (c) $-\frac{c}{b}$ (d) $\frac{a}{c}$	
7	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
8	The product of the two roots of the equation : $3x^2 - 4 = 0$ multiplying by the sum of the two roots of the equation $x^2 - 3x = 0$ is (a) 12 (b) -3 (c) -4 (d) 3	
8	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
9	If the product of the two roots of the equation : $(k - 2)x^2 - 6x + 12 = 0$ is 3 , then k = (a) zero (b) 4 (c) 6 (d) 38	
9	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
10	If M , (5 - M) are the two roots of the equation : $x^2 - kx + 6 = 0$, then k = (a) -5 (b) 5 (c) 6 (d) -8	
10	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	

11	In the quadratic equation : $aX^2 - bX + c = 0$, if the sum of the two roots equal the product of them , then b =	(a) - a (b) a (c) - c (d) c
11	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
12	If $X = -1$ is one of the two roots of the equation : $X^2 - kX - 6 = 0$, then the sum of the two roots =	(a) - 5 (b) 6 (c) - 6 (d) 5
12	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
13	If $(2 + i)$ is one of the roots of the equation : $X^2 - 4X + c = 0$, then c =	(a) 16 (b) - 16 (c) - 5 (d) 5
13	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
14	If L , M are the two roots of the equation : $X^2 - (k + 2)X - 3 = 0$ and $L + M = 0$, then k =	(a) - 2 (b) - 3 (c) 2 (d) 3
14	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
15	If $M, \frac{2}{M}$ are the roots of the equation : $aX^2 + bX + 12 = 0$, then a =	(a) 3 (b) 5 (c) 6 (d) 9
15	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	

16	If $(L + 1)$, $(M + 1)$ are the two roots of the equation : $X^2 - 3X + 2 = 0$ and $L < M$, then $L = \dots\dots\dots$ (a) zero (b) 1 (c) 2 (d) 3	
16	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
17	If L , M are the two roots of the equation : $X^2 + X + 1 = 0$, then $L + M + LM = \dots\dots\dots$ (a) zero (b) 1 (c) -1 (d) 2	
17	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
18	If L , M are the two roots of the equation : $X^2 - 21X + 4 = 0$, then : $\sqrt{L} + \sqrt{M} = \dots\dots\dots$ (a) 25 (b) 5 (c) -5 (d) ± 5	
18	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
19	If the two roots of the equation : $X^2 + bX + c = 0$ are L and L , then $b^2 + 4c = \dots\dots\dots$ (a) 0 (b) $4L^2$ (c) $8L$ (d) $8L^2$	
19	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
20	The product of the roots of the equations : $aX^2 + bX + c = 0$, $bX^2 + cX + a = 0$ and $cX^2 + aX + b = 0$ equal $\dots\dots\dots$ (a) abc (b) -1 (c) 1 (d) zero	
20	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
21	 If one of the two roots of the equation : $X^2 - (b - 3)X + 5 = 0$ is the additive inverse of the other root , then $b = \dots\dots\dots$ (a) -5 (b) -3 (c) 3 (d) 5	

21	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
22	 If one of the two roots of the equation : $x^2 - 3x + 2 = 0$ is the multiplicative inverse of the other , then a = (a) $\frac{1}{3}$ (b) $\frac{1}{2}$ (c) 2 (d) 3	
22	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	

Homework

[A] Choose the correct : -

1	The product of the two roots of the equation : $x^2 - 5x + 6 = 0$ is	(a) - 6	(b) 5	(c) - 5	(d) 6
1	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539				
2	If the two roots of the equation : $x^2 + b x + c = 0$ are L and L , then $b^2 + 4 c = \dots\dots\dots$	(a) 0	(b) $4 L^2$	(c) $8 L$	(d) $8 L^2$
2	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539				
3	If L , M are the two roots of the equation : $x^2 - (k + 2) x - 3 = 0$ and $L + M = 0$, then $k = \dots\dots\dots$	(a) - 2	(b) - 3	(c) 2	(d) 3
3	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539				
4	If $x = - 1$ is one of the two roots of the equation : $x^2 - k x - 6 = 0$, then the sum of the two roots =	(a) - 5	(b) 6	(c) - 6	(d) 5
4	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539				
5	 $3 i (- 2 i) = \dots\dots\dots$	(a) $6 i$	(b) 6	(c) - 6	(d) $- 6 i$
5	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539				
6	$i^{-30} = \dots\dots\dots$	(a) 1	(b) - 1	(c) - i	(d) i

6	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
7	$1 + i + i^2 + i^3 + i^4 = \dots\dots\dots$ (a) $4i + 1$ (b) -1 (c) 1 (d) 5	
7	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
8	The product of the two roots of the equation : $bX^2 + cX + a = 0$ equals (a) $-\frac{c}{a}$ (b) $\frac{a}{b}$ (c) $-\frac{c}{b}$ (d) $\frac{a}{c}$	
8	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
9	 If one of the two roots of the equation : $aX^2 - 3X + 2 = 0$ is the multiplicative inverse of the other , then a = (a) $\frac{1}{3}$ (b) $\frac{1}{2}$ (c) 2 (d) 3	
9	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
10	If L , M are the two roots of the equation : $X^2 + X + 1 = 0$, then $L + M + LM = \dots\dots\dots$ (a) zero (b) 1 (c) -1 (d) 2	
10	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
11	If M , $\frac{2}{M}$ are the roots of the equation : $aX^2 + bX + 12 = 0$, then a = (a) 3 (b) 5 (c) 6 (d) 9	
11	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
12	 $(-2i)^3 (-3i)^2 = \dots\dots\dots$ (a) $-72i$ (b) $72i$ (c) 72 (d) -72^*	
12	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	

13	The simplest form of the expression $i^{-45} = \dots\dots\dots$ (a) 1 (b) -1 (c) i (d) -i	
13	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
14	If $n \in \mathbb{Z}$, then $i^{8n-3} = \dots\dots\dots$ (a) i (b) -i (c) -1 (d) 1	
14	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
15	If M, (5 - M) are the two roots of the equation : $X^2 - kX + 6 = 0$, then k = (a) -5 (b) 5 (c) 6 (d) -8	
15	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
16	The sum of the two roots of the equation : $4X^2 + 4X - 35 = 0$ is (a) -1 (b) -4 (c) 1 (d) $-\frac{35}{4}$	
16	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
17	The product of the roots of the equations : $aX^2 + bX + c = 0$, $bX^2 + cX + a = 0$ and $cX^2 + aX + b = 0$ equal (a) a b c (b) -1 (c) 1 (d) zero	
17	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
18	If L, M are the two roots of the equation : $X^2 - 21X + 4 = 0$, then : $\sqrt{L} + \sqrt{M} = \dots\dots\dots$ (a) 25 (b) 5 (c) -5 (d) ± 5	
18	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	

19	 $(3 + 2i) + (2 - 5i) = \dots\dots\dots$ (a) $5 + 2i$ (b) $5 - 3i$ (c) $3 - 5i$ (d) $5 + 3i$	
19	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
20	$\frac{1}{i^{199}} = \dots\dots\dots$ (a) 1 (b) $-i$ (c) i (d) -1	
20	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
21	If $(2 + i)$ is one of the roots of the equation : $x^2 - 4x + c = 0$, then $c = \dots\dots\dots$ (a) 16 (b) -16 (c) -5 (d) 5	
21	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
22	The product of the two roots of the equation : $2x^2 - 7x - 6 = 0$ equal $\dots\dots\dots$ (a) -6 (b) $\frac{7}{2}$ (c) 3 (d) -3	
22	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
23	The sum of the two roots of the equation : $5x^2 - 3 = 0$ is $\dots\dots\dots$ (a) $\frac{3}{5}$ (b) $-\frac{3}{5}$ (c) zero (d) $\frac{5}{3}$	
23	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
24	 If one of the two roots of the equation : $x^2 - (b - 3)x + 5 = 0$ is the additive inverse of the other root , then $b = \dots\dots\dots$ (a) -5 (b) -3 (c) 3 (d) 5	
24	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	

25	Which of the following is an imaginary number ? (a) π (b) $\sqrt{5}$ (c) $\sqrt{-5}$ (d) i^2	
25	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
26	$i^{26} + i^{28} = \dots\dots\dots$ (a) i^{54} (b) $-i$ (c) zero (d) 2	
26	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
27	If $(L + 1)$, $(M + 1)$ are the two roots of the equation : $x^2 - 3x + 2 = 0$ and $L < M$, then $L = \dots\dots\dots$ (a) zero (b) 1 (c) 2 (d) 3	
27	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
28	The product of the two roots of the equation : $3x^2 - 4 = 0$ multiplying by the sum of the two roots of the equation $x^2 - 3x = 0$ is $\dots\dots\dots$ (a) 12 (b) -3 (c) -4 (d) 3	
28	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
29	The product of the two roots of the equation : $3 + 2x - \frac{1}{4}x^2 = 0$ equals $\dots\dots\dots$ (a) $-\frac{2}{3}$ (b) 12 (c) -12 (d) $\frac{3}{4}$	
29	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
30	 $\sqrt{-18} \times \sqrt{-12} = \dots\dots\dots$ (a) $6\sqrt{6}i$ (b) $6\sqrt{6}$ (c) $-6\sqrt{6}$ (d) $-6\sqrt{6}i$	
30	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	

31	$i^{24} = \dots\dots\dots$ (a) -1 (b) i^9 (c) $-i$ (d) 1	
31	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
32	$\frac{1}{i^{15}} + i^{21} = \dots\dots\dots$ (a) zero (b) $2i$ (c) $-2i$ (d) $-i$	
32	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
33	The sum of the two roots of the equation : $x^2 + 3x - 10 = 0$ is (a) 10 (b) -10 (c) 3 (d) -3	
33	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
34	In the quadratic equation : $ax^2 - bx + c = 0$, if the sum of the two roots equal the product of them , then $b = \dots\dots\dots$ (a) $-a$ (b) a (c) $-c$ (d) c	
34	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
35	If the product of the two roots of the equation : $(k-2)x^2 - 6x + 12 = 0$ is 3 , then $k = \dots\dots\dots$ (a) zero (b) 4 (c) 6 (d) 38	
35	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
36	 $(-4i)(-6i) = \dots\dots\dots$ (a) $-10i$ (b) $24i$ (c) $-24i$ (d) -24	
36	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	

37	The simplest form of the imaginary number i^{45} is	
	(a) i (b) -1 (c) $-i$ (d) 1	
37	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	
38	$5i^7 + 4i^{-1} = \dots\dots\dots$	
	(a) $9i$ (b) $-9i$ (c) i (d) $-i$	
38	Mr. Mahmoud Abu Heba For math online mobile 01110882717 - 01006487539	

[B] Essay problems : -

1	 If the sum of the two roots of the equation : $2x^2 + bx - 5 = 0$ is $\frac{-3}{2}$, find the value of b, then solve the equation in the set of complex numbers. « $b = 3$, $x = \frac{-5}{2}$ or $x = 1$ »	
2	 Find the values of a, b in each of the following equations, if : (1) $2, 5$ are the two roots of the equation : $x^2 + ax + b = 0$ « $a = -7$, $b = 10$ » (2) $-3, 7$ are the two roots of the equation : $ax^2 - bx - 21 = 0$ « $a = 1$, $b = 4$ »	
3	 If the product of the two roots of the equation : $3x^2 + 10x - c = 0$ is $\frac{-8}{3}$, find the value of c, then solve the equation in the set of complex numbers. « $c = 8$, $x = \frac{2}{3}$ or $x = -4$ »	
4	Without solving the equation, find the sum and the product of the two roots of each of the following equations : (1)  $3x^2 = 23x - 30$	
5	Find the other root of the equation, then find the value of a in each of the following where $a \in \mathbb{R}$: (1)  If $x = -1$ is one of the two roots of the equation : $x^2 - 2x + a = 0$ « $3, -3$ » (2) If $x = \frac{1}{2}$ is one of the two roots of the equation : $2x^2 - ax + 3 = 0$ « $3, 7$ » (3)  If $(1 + i)$ is one of the two roots of the equation : $x^2 - 2x + a = 0$ « $1 - i, 2$ »	

Find the value of k in each of the following which makes :

- (1)  One of the roots of the equation : $x^2 + (k - 1)x - 3 = 0$ is the additive inverse of the other roots. « 1 »
- 6 (2) One of the roots of the equation : $(k - 2)x^2 + (k - 3)x - 4 = 0$ is the multiplicative inverse of the other root. « - 2 »
- (3)  One of the roots of the equation : $4kx^2 + 7x + k^2 + 4 = 0$ is the multiplicative inverse of the other. « 2 »

Solutions

Exercises

[A] Choose the correct : -

1	D
2	A
3	C
4	D
5	D
6	C
7	B
8	C

9	C
10	B
11	D
12	D
13	D
14	A
15	C
16	A
17	A
18	B
19	D
20	C
21	C
22	C

Homework

[A] Choose the correct : -

1	D
2	D
3	A
4	D
5	B
6	B
7	C
8	B
9	C
10	A
11	C
12	A
13	D
14	A
15	B

16	A
17	C
18	B
19	B
20	C
21	D
22	D
23	C
24	C
25	C
26	C
27	A
28	C
29	C
30	C
31	D
32	B

33	D
34	D
35	C
36	D
37	A
38	B

Sec [1] - First Term - Geometry - Unit [3] : Similarity

Lesson [1] : Similarity Of Polygons

Definition :

Two polygons M1 and M2 (of same number of sides) are said to be similar if the following two conditions satisfied together :

- 1) Their corresponding angles are congruent. (Equal in measure)
- 2) The lengths of their corresponding sides are proportional.

In this case , we shall write : The polygon M1 ~ [similar] the polygon M2

Remark [1]

If the polygon ABCD ~ the polygon XYZL , then :

$$\frac{AB}{XY} = \frac{BC}{YZ} = \frac{CD}{ZL} = \frac{DA}{LX} = K \text{ (similarity ratio or scale factor of similarity) , } K > 0$$

$K > 1$: enlargement

$K < 1$: Shrinking

$K = 1$: congruent

Remark [2]

- 1) The congruent polygons are similar but it's not all similar polygons are congruent.
- 2) If each of two polygons is similar to a third polygon , then they are similar
- 3) All regular polygons of the same number of sides are similar.
- 4) All equilateral triangles are similar And All squares are similar.
- 5) Ratio perimeters of two similar polygons = ratio lengths of two sides

Lesson [2] : Similarity Of Triangles

Cases of similarity of triangles : First Case

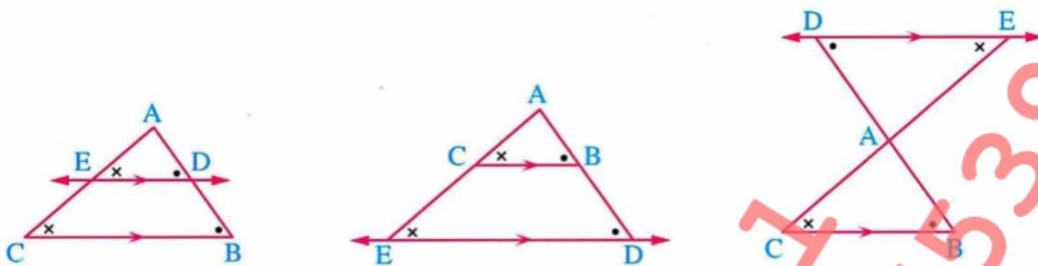
Postulate (A. A. similarity postulate)

If two angles of one triangle are congruent to their two corresponding angles of another triangle , then the two triangles are similar.

Remark [3]

- 1) The two right-angled triangles are similar if the measure of an acute angle in one of them equals the measure of an acute angle in the other.
- 2) The two isosceles triangles are similar if the measure of an angle in one of them equals the measure of the corresponding angle in the other.

Corollary [1] : If a line is drawn parallel to one side of a triangle and intersects the other two sides or the lines containing them , then the resulting triangle is similar to the original triangle.



If $\overline{DE} \parallel \overline{BC}$ and intersects $\overline{AB}$ and $\overline{AC}$ at D and E respectively , then $\triangle ABC \sim \triangle ADE$

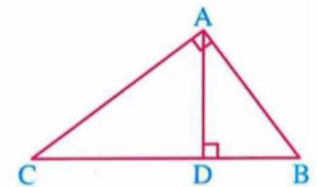
Corollary [2] : In any right-angled triangle , the altitude to the hypotenuse separates the triangle into two triangles which are similar to each other and to the original triangle.

In the opposite figure :

If $\triangle ABC$ is a right-angled triangle at A and $\overline{AD} \perp \overline{BC}$

, then $\triangle DBA \sim \triangle DAC \sim \triangle ABC$

and it is left to the student to prove this corollary by using the previous postulate and its remarks.



Second Case : Theorem [1] : S.S.S. similarity theorem

If the side lengths of two triangles are in proportion , then the two triangles are similar.

Third Case : Theorem [2] : S.A.S. Similarity theorem

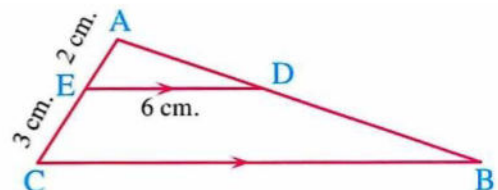
If an angle of one triangle is congruent to an angle of another triangle and lengths of the sides including those angles are in proportion , then the triangles are similar.

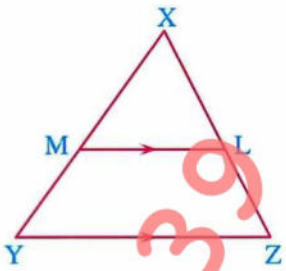
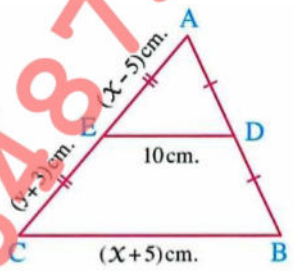
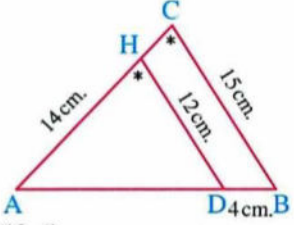
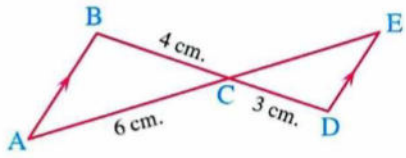
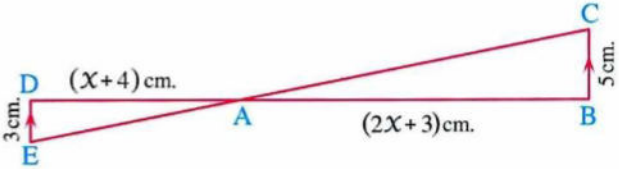
Exercises

[A] Choose the correct : -

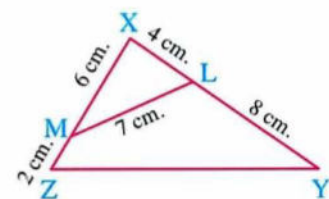
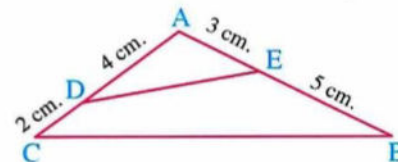
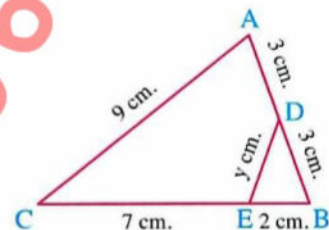
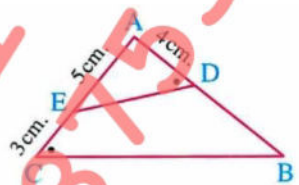
1	If k is the scale factor of similarity of polygon M_1 to polygon M_2 and the polygon M_1 is minimization to polygon M_2 , then K may be equal	B
	(a) 1 (b) $\frac{3}{5}$ (c) $\frac{3}{2}$ (d) zero	
2	The two similar polygons are congruent if the scale factor K satisfies	B
	(a) $K = \frac{1}{2}$ (b) $K = 1$ (c) $K > 1$ (d) $0 < K < 1$	

3	If $\triangle ABC \sim \triangle DEF$, $BC = 3 EF$, then the scale factor of similarity of the two triangles = (a) $\frac{2}{3}$ (b) $\frac{1}{2}$ (c) 1 (d) 3	D
4	If M_1 , M_2 are two similar polygons and the lengths of two corresponding sides are 20 cm. , 16 cm respectively , then the perimeter of polygon M_1 : the perimeter of M_2 = (a) 25 : 16 (b) 41 : 9 (c) 9 : 41 (d) 5 : 4	D
5	Two similar polygons , the ratio between their perimeters equal 4 : 9 , then the ratio between the lengths of two corresponding sides is (a) 4 : 9 (b) 2 : 3 (c) 16 : 81 (d) 9 : 4	A
6	Two similar polygons , the ratio between the lengths of two corresponding sides is 3 : 4 , if the perimeter of the smaller is 15 cm. , then the perimeter of the bigger is cm. (a) 20 (b) $\frac{80}{3}$ (c) 27 (d) $\frac{95}{4}$	A
7	Two similar rectangles , the dimensions of the first are 12 cm. , 8 cm. and the perimeter of the second equals 60 cm. , then the length of the second rectangle = cm. (a) 12 (b) 18 (c) 24 (d) 16	B
8	If $\triangle ABC \sim \triangle DEF$, $AB = 3$ cm. , $DE = 6$ cm. , $EF = 8$ cm. , then BC = cm. (a) 4 (b) 3 (c) 2 (d) 15	A
9	The perimeter of one triangle of two similar triangles is 74 cm. and the side lengths of the second are 4.5 cm. , 6 cm. , 8 cm. , then the length of the greatest side in the first triangle equals cm. (a) 4 (b) 64 (c) 32 (d) 16	C
10	In the opposite figure : If $\overline{ED} \parallel \overline{BC}$, $AE = 2$ cm. , $EC = 3$ cm. , $ED = 6$ cm. , then BC = cm. (a) 9 (b) 15 (c) 12 (d) 10	B



11	In the opposite figure : If $\overline{LM} \parallel \overline{YZ}$, $\frac{LM}{YZ} = \frac{4}{7}$, then $\frac{YM}{MX} = \dots\dots\dots$ (a) $\frac{11}{4}$ (b) $\frac{3}{4}$ (c) $\frac{4}{3}$ (d) $\frac{4}{11}$		B
12	In the opposite figure : D, E are midpoints of $\overline{AB}$, $\overline{AC}$, then the length of $X + y = \dots\dots\dots$ cm. (a) 15 (b) 7 (c) 22 (d) 11		C
13	In the opposite figure : If $m(\angle AHD) = m(\angle C)$, $AH = 14$ cm. , $HD = 12$ cm. , $CB = 15$ cm. , $DB = 4$ cm. , then $AC + AD + AB = \dots\dots\dots$ cm. (a) 62.5 (b) 48 (c) 56 (d) 53.5 *		D
14	In the opposite figure : If $\overline{AB} \parallel \overline{DE}$, $CD = 3$ cm. , $AC = 6$ cm. , $BC = 4$ cm. , then : $CE = \dots\dots\dots$ cm. (a) 5.4 (b) 4.5 (c) 8 (d) 2.5		B
15	In the opposite figure : $X = \dots\dots\dots$ (a) 5 (b) 9 (c) 11 (d) 12		C
16	Two angles of a triangle with measures 50° , 70° similar to another triangle with angles of measures 50° and $\dots\dots\dots^\circ$ (a) 60 (b) 80 (c) 55 (d) 40		A

17	If two triangles , the first has two angles of measures 50° and 60° , the second has two angles of measures 60° and 70° , then the two triangles are (a) congruent and not similar. (b) similar and not necessary congruent. (c) congruent and similar. (d) not congruent and not similar.	B
18	In the opposite figure : BD = cm. (a) 5 (b) 6 (c) 4 (d) 7	B
19	In the opposite figure : y = cm. (a) 2 (b) 4.5 (c) 3.5 (d) 3	D
20	In the opposite figure : The ratio between the perimeters of the two triangles ADE , ABC is (a) 2 : 1 (b) 3 : 5 (c) 1 : 2 (d) 1 : 4	C
21	In the opposite figure : If $L \in \overline{XY}$ where $XL = 4$ cm. , $YL = 8$ cm. , $M \in \overline{XZ}$ where $XM = 6$ cm. , $ZM = 2$ cm. , $LM = 7$ cm. , then the length of $\overline{YZ}$ = cm. (a) 21 (b) 28 (c) 14 (d) 3	C



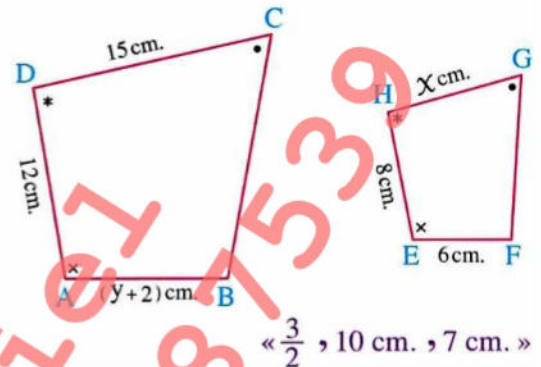
[B] Essay problems : -

 In the opposite figure :

Polygon ABCD ~ polygon EFGH

(1) Find : The scale factor of similarity of polygon ABCD to polygon EFGH

(2) Find the values of : x and y



1

$\therefore$ Polygon ABCD ~ polygon EFGH

$$\therefore \frac{AB}{EF} = \frac{BC}{FG} = \frac{CD}{GH} = \frac{AD}{EH} = \text{scale factor}$$

$$\therefore \frac{(y+2)}{6} = \frac{BC}{FG} = \frac{15}{x} = \frac{12}{8}$$

$$\therefore \text{Scale factor} = \frac{12}{8} = \frac{3}{2}$$

$$\therefore x = 10 \text{ cm.}, y + 2 = 9$$

$$\therefore y = 7 \text{ cm.}$$

(First req.)

(Second req.)

 Two similar rectangles , the dimensions of the first are 8 cm. and 12 cm. , and the perimeter of the second is 200 cm. Find the length of the second rectangle and its area.

« 60 cm. , 2400 cm². »

Let the two dimensions of the second rectangle be x cm. and y cm.

2

$\therefore$ The two rectangles are similar.

$$\therefore \frac{8}{x} = \frac{12}{y} = \frac{40}{200}$$

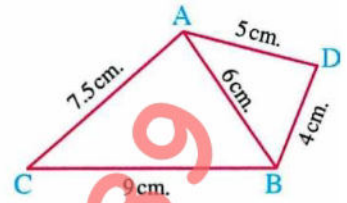
$$\therefore x = 40 \text{ cm.}, y = 60 \text{ cm.}$$

$$\therefore \text{Area of second rectangle} = 40 \times 60 = 2400 \text{ cm}^2$$

(The req.)

 In the opposite figure :

ABC is a triangle in which : $AB = 6 \text{ cm.}$, $BC = 9 \text{ cm.}$,
 $AC = 7.5 \text{ cm.}$, D is a point outside the triangle ABC where
 $DB = 4 \text{ cm.}$, $DA = 5 \text{ cm.}$ **Prove that :**



(1) $\triangle ABC \sim \triangle DBA$

(2) $\overrightarrow{BA}$ bisects $\angle DBC$

3

$$\therefore \frac{AB}{DB} = \frac{6}{4} = \frac{3}{2}, \frac{BC}{BA} = \frac{9}{6} = \frac{3}{2}, \frac{AC}{DA} = \frac{7.5}{5} = \frac{3}{2}$$

$$\therefore \frac{AB}{DB} = \frac{BC}{BA} = \frac{AC}{DA}$$

$$\therefore \triangle ABC \sim \triangle DBA$$

(Q.E.D. 1)

We deduce that : $m(\angle ABD) = m(\angle ABC)$

$\therefore \overrightarrow{BA}$ bisects $\angle DBC$

(Q.E.D. 2)

 In $\triangle ABC$, $AC > AB$, $M \in \overline{AC}$ where $m(\angle ABM) = m(\angle C)$

Prove that : $(AB)^2 = AM \times AC$

In $\triangle ABM$, $\triangle ACB$:

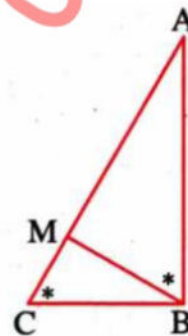
$\therefore \angle A$ is a common angle

, $m(\angle ABM) = m(\angle C)$

$\therefore \triangle ABM \sim \triangle ACB$

$$\therefore \frac{AB}{AC} = \frac{AM}{AB}$$

$$\therefore (AB)^2 = AM \times AC$$

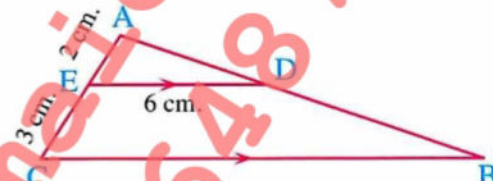
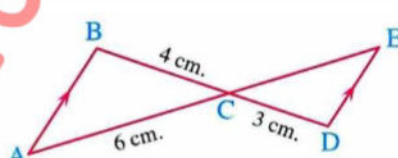
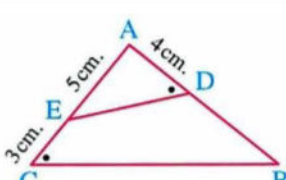


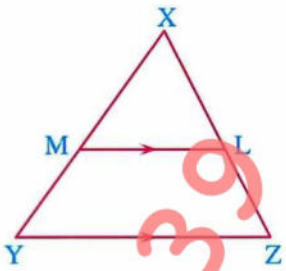
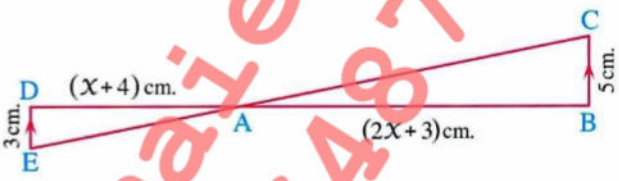
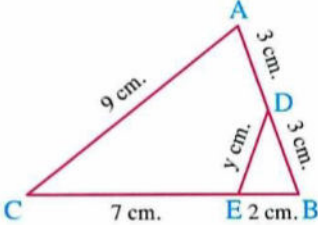
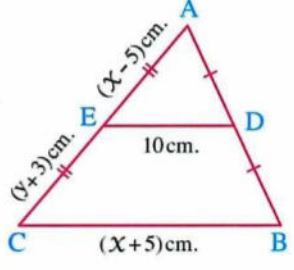
(Q.E.D.)

Homework

[A] Choose the correct : -

1	Two similar polygons , the ratio between their perimeters equal 4 : 9 , then the ratio between the lengths of two corresponding sides is	A
	(a) 4 : 9 (b) 2 : 3 (c) 16 : 81 (d) 9 : 4	
2	The perimeter of one triangle of two similar triangles is 74 cm. and the side lengths of the second are 4.5 cm. , 6 cm. , 8 cm. , then the length of the greatest side in the first triangle equals cm.	C
	(a) 4 (b) 64 (c) 32 (d) 16	
3	In the opposite figure : If $m(\angle AHD) = m(\angle C)$, $AH = 14$ cm. , $HD = 12$ cm. , $CB = 15$ cm. , $DB = 4$ cm. , then $AC + AD + AB = \dots\dots\dots$ cm.	D
	(a) 62.5 (b) 48 (c) 56 (d) 53.5 *	
4	If two triangles , the first has two angles of measures 50° and 60° , the second has two angles of measures 60° and 70° , then the two triangles are (a) congruent and not similar. (b) similar and not necessary congruent. (c) congruent and similar. (d) not congruent and not similar.	B
5	In the opposite figure : If $L \in \overline{XY}$ where $XL = 4$ cm. , $YL = 8$ cm. , $M \in \overline{XZ}$ where $XM = 6$ cm. , $ZM = 2$ cm. , $LM = 7$ cm. , then the length of $\overline{YZ} = \dots\dots\dots$ cm.	C
	(a) 21 (b) 28 (c) 14 (d) 3	
6	If k is the scale factor of similarity of polygon M_1 to polygon M_2 and the polygon M_1 is minimization to polygon M_2 , then K may be equal (a) 1 (b) $\frac{3}{5}$ (c) $\frac{3}{2}$ (d) zero	B

7	The two similar polygons are congruent if the scale factor K satisfies (a) $K = \frac{1}{2}$ (b) $K = 1$ (c) $K > 1$ (d) $0 < K < 1$	B
8	Two similar polygons , the ratio between the lengths of two corresponding sides is 3 : 4 , if the perimeter of the smaller is 15 cm. , then the perimeter of the bigger is cm. (a) 20 (b) $\frac{80}{3}$ (c) 27 (d) $\frac{95}{4}$	A
9	In the opposite figure : If $\overline{ED} \parallel \overline{BC}$, $AE = 2$ cm. , $EC = 3$ cm. , $ED = 6$ cm. , then $BC =$ cm. (a) 9 (b) 15 (c) 12 (d) 10 	B
10	In the opposite figure : If $\overline{AB} \parallel \overline{DE}$, $CD = 3$ cm. , $AC = 6$ cm. , $BC = 4$ cm. , then : $CE =$ cm. (a) 5.4 (b) 4.5 (c) 8 (d) 2.5 	B
11	In the opposite figure : $BD =$ cm. (a) 5 (b) 6 (c) 4 (d) 7 	B
12	If $\triangle ABC \sim \triangle DEF$, $BC = 3 EF$, then the scale factor of similarity of the two triangles = (a) $\frac{2}{3}$ (b) $\frac{1}{2}$ (c) 1 (d) 3	D
13	Two similar rectangles , the dimensions of the first are 12 cm. , 8 cm. and the perimeter of the second equals 60 cm. , then the length of the second rectangle = cm. (a) 12 (b) 18 (c) 24 (d) 16	B

14	In the opposite figure : If $\overline{LM} \parallel \overline{YZ}$, $\frac{LM}{YZ} = \frac{4}{7}$, then $\frac{YM}{MX} = \dots\dots\dots$ (a) $\frac{11}{4}$ (b) $\frac{3}{4}$ (c) $\frac{4}{3}$ (d) $\frac{4}{11}$		B
15	In the opposite figure : $x = \dots\dots\dots$ (a) 5 (b) 9 (c) 11 (d) 12		C
16	In the opposite figure : $y = \dots\dots\dots$ cm. (a) 2 (b) 4.5 (c) 3.5 (d) 3		D
17	If M_1, M_2 are two similar polygons and the lengths of two corresponding sides are 20 cm. , 16 cm respectively , then the perimeter of polygon M_1 : the perimeter of $M_2 = \dots\dots\dots$ (a) 25 : 16 (b) 41 : 9 (c) 9 : 41 (d) 5 : 4 .		D
18	If $\triangle ABC \sim \triangle DEF$, $AB = 3$ cm. , $DE = 6$ cm. , $EF = 8$ cm. , then $BC = \dots\dots\dots$ cm. (a) 4 (b) 3 (c) 2 (d) 15		A
19	In the opposite figure : D , E are midpoints of $\overline{AB}$, $\overline{AC}$, then the length of $x + y = \dots\dots\dots$ cm. (a) 15 (b) 7 (c) 22 (d) 11		C
20	Two angles of a triangle with measures 50° , 70° similar to another triangle with angles of measures 50° and $\dots\dots\dots^\circ$ (a) 60 (b) 80 (c) 55 (d) 40		A

In the opposite figure :

The ratio between the perimeters of the two triangles

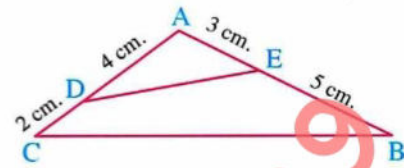
21 ADE , ABC is

(a) 2 : 1

(b) 3 : 5

(c) 1 : 2

(d) 1 : 4



C

[B] Essay problems : -

In the opposite figure :

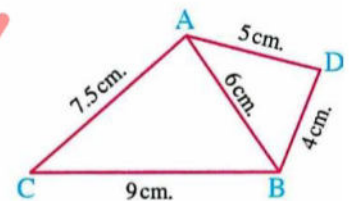
ABC is a triangle in which : $AB = 6$ cm. , $BC = 9$ cm. ,

$AC = 7.5$ cm. , D is a point outside the triangle ABC where

$DB = 4$ cm. , $DA = 5$ cm. **Prove that :**

(1) $\triangle ABC \sim \triangle DBA$

(2) $\overrightarrow{BA}$ bisects $\angle DBC$

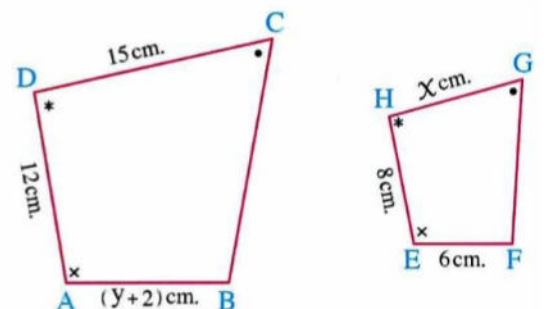


In the opposite figure :

Polygon ABCD $\sim$ polygon EFGH

(1) **Find :** The scale factor of similarity of polygon ABCD to polygon EFGH

(2) **Find the values of :** x and y



« $\frac{3}{2}$, 10 cm. , 7 cm. »

Two similar rectangles , the dimensions of the first are 8 cm. and 12 cm. , and the perimeter of the second is 200 cm. Find the length of the second rectangle and its area.

« 60 cm. , 2400 cm^2 . »

In $\triangle ABC$, $AC > AB$, $M \in \overline{AC}$ where $m(\angle ABM) = m(\angle C)$

Prove that : $(AB)^2 = AM \times AC$

حمل الآن

مجاناً وحصرياً

المراجعة رقم (4)

اختبار شهر اكتوبر



October Exam Revision



In the opposite figure: $(x) = ax^2 + bx + c$, then $\frac{b+c}{a}$

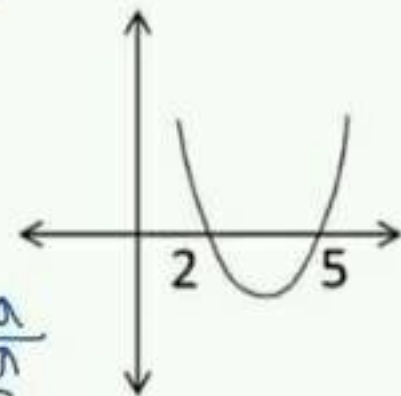
- a) 3
- b) 7
- c) 5
- d) 10

$$f(x) = a(x-2)(x-5)$$

$$f(x) = ax^2 - 7ax + 10a$$

$$b = -7a \quad c = 10a$$

$$\therefore \frac{b+c}{a} = \frac{-7a+10a}{a} = \frac{3a}{a} = 3$$



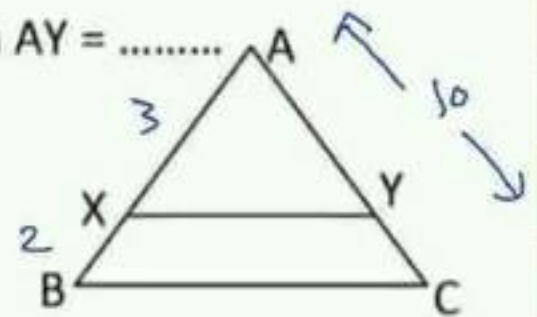
If $XY \parallel CB$, $AX = 3$ cm, $XB = 2$ cm, $AC = 10$ cm, then $AY = \dots\dots\dots$

- a) 4
- b) 6
- c) 8
- d) 9

$$\triangle AXY \sim \triangle ABC$$

$$\therefore \frac{AX}{AB} = \frac{AY}{AC}$$

$$\frac{3}{5} = \frac{AY}{10} \Rightarrow AY = 6$$



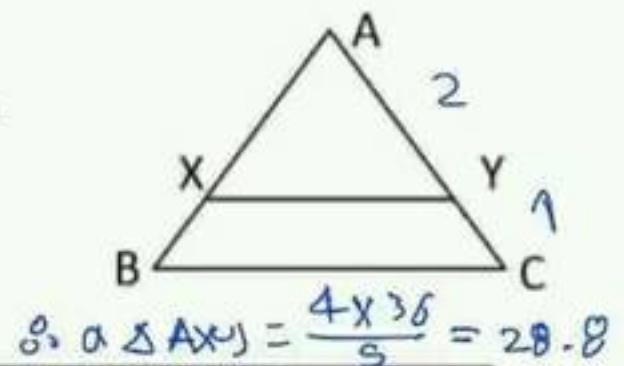
If $XY \parallel CB$, $AY = 2$ YC, area of the polygon XYCB = 36 cm^2 , then area of $\triangle AXY = \dots\dots\dots$

- a) 24
- b) 72
- c) 28.8
- d) 32.5

$$\frac{AY}{YC} = \frac{2}{1}, \triangle AXY \sim \triangle ABC$$

$$\therefore \frac{\text{area } \triangle AXY}{\text{area } \triangle ABC} = \left(\frac{AY}{AC}\right)^2 = \frac{4}{9}$$

$$\therefore \text{area } \triangle AXY : \text{area } \triangle ABC : \text{diff} \\ 4 : 9 : 5 \\ : 36$$



$$\therefore \text{area } \triangle AXY = \frac{4 \times 36}{9} = 28.8$$

X

if the solution set of the inequality $x^2 - 10 < bx$ is $]-2, 5[$, then

- b =
- a) -10
- b) -2
- c) 3
- d) 5

In the opposite figure:

EA = 3cm, AB = 5 cm, EC = 1.5 cm, then CD =

a) 16

b) 14.5

c) 15

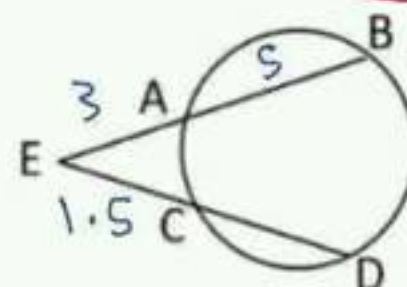
d) 17

$$EA \times EB = EC \times ED$$

$$3 \times 8 = 1.5 \times ED$$

$$\therefore ED = 16$$

$$\therefore CD = 16 - 1.5 = 14.5$$



If $3i$ and $-3i$ are two roots of the equation

a) $x^2 + 9 = 0$

b) $x^2 - 9 = 0$

c) $x^2 + 9x + 4 = 0$

d) $x^2 + 3x + 2 = 0$

In the opposite figure: EA = 6cm, EC = 4cm, MC = AB, the circumference of the circle M =

a) 10

b) 20

c) 20π

d) 10π

$$EA \times EB = EC \times ED$$

$$6(6+x) = 4(4+2x)$$

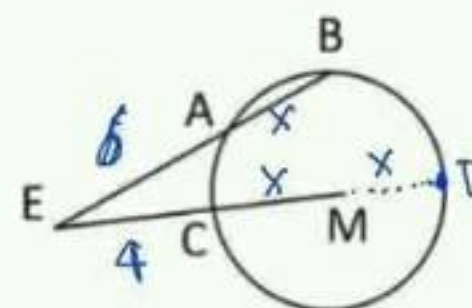
$$36 + 6x = 16 + 8x$$

$$20 = 2x$$

$$x = 10$$

$$r = 10$$

$$\text{Circumference} = 2\pi r = 2\pi \times 10 = 20\pi$$



Inscribed angle of measure 0.5^{rad} , subtended by arc length π cm, then the circumference of the circle is

a) 0.25π

b) $2\pi^2$

c) π^3

d) π

$$\theta^{\text{rad}} = \frac{L}{r}$$

$$2 \times 0.5 = \frac{\pi}{r} \Rightarrow r = \frac{\pi}{2 \times 0.5} = \pi$$

$$\text{Circumference} = 2\pi r$$

$$= 2\pi \times \pi = 2\pi^2$$

X

The equation whose roots $(2 + 3i)$, $(2 - 3i)$ is

- a) $x^2 + 4x + 13 = 0$
- b) $x^2 - 4x + 13 = 0$
- c) $x^2 + 4x - 13 = 0$
- d) $x^2 - 4x - 13 = 0$

X

If m and $2m$ are positive roots, of the equation $x^2 - nx + 18 = 0$ then $n =$

- a) 3
- b) 6
- c) 9
- d) 12

The radian measure of the central angle subtending arc of length equals the length of its radius is

- a) $(2)^{rad}$
- b) $(1)^{rad}$
- c) 5
- d) $\frac{1}{2}$

$$\theta^{rad} = \frac{L}{r} = \frac{r}{r} = 1^{rad}$$

$\triangle ABC \sim \triangle XYZ$, area of $\triangle ABC = 36 \text{ cm}^2$, $\frac{\text{peri.} \triangle ABC}{\text{peri} \triangle XYZ} = \frac{3}{4}$ then

area of $\triangle XYZ =$

- a) 64
- b) 16
- c) 9
- d) 72

$$\begin{aligned} \frac{\text{area } \triangle ABC}{\text{area } \triangle XYZ} &= \left(\frac{\text{peri } \triangle ABC}{\text{peri } \triangle XYZ} \right)^2 \\ \frac{36}{\text{area } \triangle XYZ} &= \frac{3^2}{4^2} \\ \text{area } \triangle XYZ &= \frac{36 \times 4^2}{3^2} \\ &= 64 \end{aligned}$$

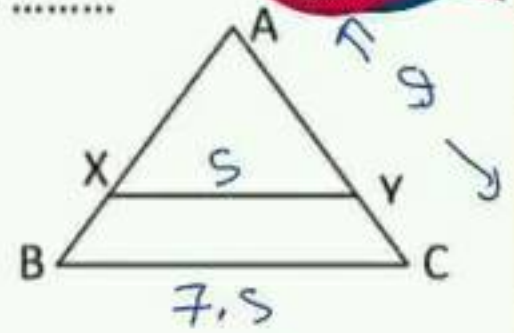
BEST LUCK

Mr. Ahmed Bahi
Professor Of mathematics
01095680229

If $XY \parallel CB$, $XY = 5$ cm, $CB = 7.5$, $AC = 9$ cm, then $AY = \dots\dots\dots$

- a) 3
- b) 6**
- c) 9
- d) 12

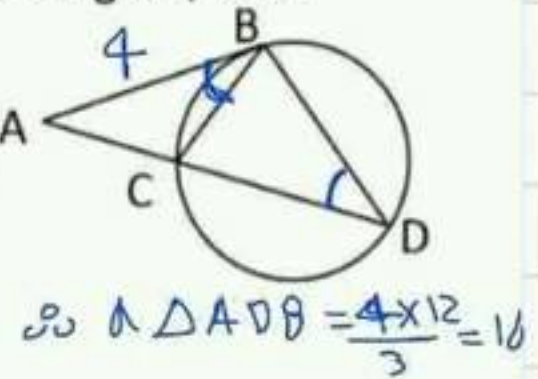
$$\begin{aligned} \triangle AXY &\sim \triangle ABC \\ \frac{AX}{AB} &= \frac{XY}{BC} = \frac{AY}{AC} \\ \frac{5}{7.5} &= \frac{AY}{9} \\ AY &= 6 \end{aligned}$$



$AB = 4$ cm, $AD = 8$ cm, area of $\triangle BCD = 12$ cm², AB is a tangent, then area of $\triangle ABD =$

- a) 16**
- b) 17
- c) 18
- d) 19

$$\begin{aligned} \triangle ABC &\sim \triangle ADC \\ \frac{\text{area } \triangle ABC}{\text{area } \triangle ADC} &= \frac{(AB)^2}{(AD)^2} = \frac{4^2}{8^2} = \frac{1}{4} \\ \text{area } \triangle ABC : \text{area } \triangle ADC &: \text{diff} \\ 1 : 4 &: 3 \\ &: 12 \end{aligned}$$



The equation $3x^2 + mx + 27 = 0$, has two equal real solutions, $m =$

- a) 18
- b) -18
- c) -18 or 18**
- d) 27

$$\begin{aligned} b^2 - 4ac &= 0 \\ m^2 - 4 \times 3 \times 27 &= 0 \\ m^2 &= 324 \\ m &= \pm 18 \end{aligned}$$

X

If one root of the equation $2x^2 + mx + 5x + 12 = 0$ is the additive inverse of the other then $m =$

- a) 5
- b) -5
- c) 6
- d) -6**

The angle of measure 60° in the standard position is equivalent to the angle of measure

- a) 120°
- b) 240°
- c) 420°**
- d) 360°

$$60^\circ + 360^\circ = 420^\circ$$

The equation whose roots $(2 + 3i)$, $(2 - 3i)$ is

a) $x^2 + 4x + 13 = 0$

b) $x^2 - 4x + 13 = 0$

c) $x^2 + 4x - 13 = 0$

d) $x^2 - 4x - 13 = 0$

X

If m and $2m$ are positive roots, of the equation $x^2 - nx + 18 = 0$ then $n =$

a) 3

b) 6

c) 9

d) 12

The radian measure of the central angle subtending arc of length equals the length of its radius is

a) $(2)^{rad}$

b) $(1)^{rad}$

c) 5

d) $\frac{1}{2}$

$$L = r\theta$$

$$\theta^{rad} = \frac{L}{r} = \frac{r}{r} = 1^{rad}$$

$\triangle ABC \sim \triangle XYZ$, area of $\triangle ABC = 36 \text{ cm}^2$, $\frac{\text{peri.} \triangle ABC}{\text{peri} \triangle XYZ} = \frac{3}{4}$ then

area of

$\triangle XYZ =$

a) 64

b) 16

c) 9

d) 72

$$\frac{p_1}{p_2} = \frac{\sqrt{A_1}}{\sqrt{A_2}}$$

$$\frac{3}{4} = \frac{\sqrt{36}}{\sqrt{A_2}} \Rightarrow \frac{9}{16} = \frac{36}{A_2}$$

$\therefore A_2 = 64$

BEST LUCK

Mr. Ahmed Bahi
Professor Of mathematics
01095680229

Central angle of measure 1^{rad} subtended by arc length L cm, the area of the circle is $9\pi \text{ cm}^2$, then $L = \dots\dots\dots$ cm

- a) 9
- b) 0.5
- c) 3
- d) 4.5

$$\text{Area} = \pi r^2 = 9\pi \Rightarrow r = 3$$

$$\theta^{\text{rad}} = \frac{L}{r} \Rightarrow 1 = \frac{L}{3} \Rightarrow L = 3$$

ABC is right angled triangle in B, $\perp AC$, $AD = 3$ cm, $CD = 5$ cm,

CE = EB
 CE =

- a) 3
- b) $2\sqrt{5}$
- c) 4
- d) 5

$$\triangle CDE \sim \triangle CBA$$

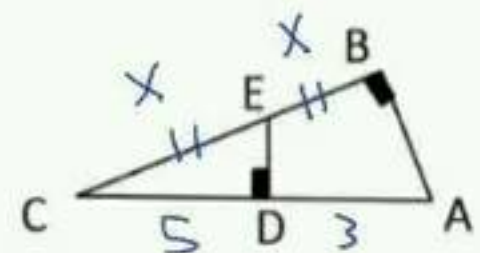
$$\frac{CD}{CB} = \frac{DE}{BA} = \frac{CE}{CA}$$

$$\frac{5}{2x} = \frac{DE}{BA} = \frac{x}{8}$$

$$2x^2 = 40$$

$$x^2 = 20$$

$$\Rightarrow x = 2\sqrt{5} \Rightarrow CE = 2\sqrt{5}$$



If $\frac{AX}{AB} = \frac{AY}{AC}$, $(\angle C) = L + 10$, $m(\angle XYB) = 4L - 30$, then $L =$

- a) 30
- b) 40
- c) 50
- d) 60

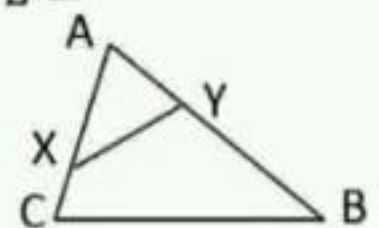
$$\triangle AXY \sim \triangle ABC$$

$$\therefore \angle AXY = \angle ACB$$

$$180 - (4L - 30) = L + 10$$

$$180 - 4L + 30 = L + 10$$

$$200 = 5L \Rightarrow L = 40$$



Which of the following is factoring to the expression: $4x^2 + 9$

- a) $(2x + 3)(2x - 3)$
- b) $(2xi + 3)(2xi - 3)$
- c) $(x + \frac{3}{2}i)(x - \frac{3}{2}i)$
- d) $4(x + \frac{3}{2}i)(x - \frac{3}{2}i)$

$\Downarrow$

$$(2x + 3i)(2x - 3i)$$

$$2(x + \frac{3}{2}i)2(x - \frac{3}{2}i)$$

$$4(x + \frac{3}{2}i)(x - \frac{3}{2}i)$$

If $(\angle AXY) = m(\angle ABC)$, $AX = m - 2$, $AB = m + 2$, $BC = 4$, $YX = 3$, then

$m =$

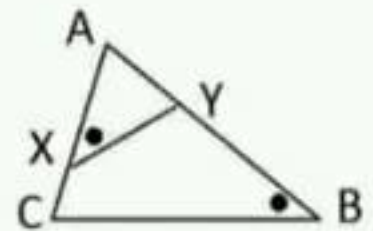
a) 13

b) 14

c) 15

d) 16

$$\begin{aligned} \triangle AXY &\sim \triangle ABC \\ \frac{AX}{AB} &= \frac{XY}{BC} = \frac{AY}{AC} \\ \frac{m-2}{m+2} &= \frac{3}{4} \\ 4m-8 &= 3m+6 \\ m &= 14 \end{aligned}$$



The sign of the function $f(x) = (3 - x)(x + 2)$, is positive then $x \in$

a) $R -]-2, 3[$

b) $R - [-2, 3]$

c) $[-2, 3]$

d) $] -2, 3[$

ABC is right angled triangle in B, $BD \perp AC$, $AD = 4\text{cm}$, $CD = 2X + 1$

cm, $BD = 6\text{ cm}$, $X =$

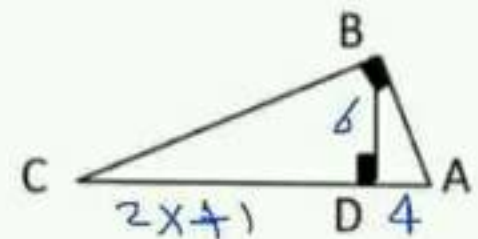
a) 4

b) 5

c) 6

d) 7

$$\begin{aligned} (BD)^2 &= DA \times DC \\ 6^2 &= 4(2X+1) \\ 36 &= 8X+4 \\ 32 &= 8X \\ X &= 4 \end{aligned}$$



$$\begin{aligned} (1-i)^8 &= ((1-i)^2)^4 = (-2i)^4 = (-2)^4 (i)^4 \\ &= 16 \times 1 \\ &= 16 \end{aligned}$$

a) 8

b) -8

c) 16

d) -16

$2AE = ED$, area of $\triangle CED = 12\text{ cm}^2$, then area of $\triangle ABE =$

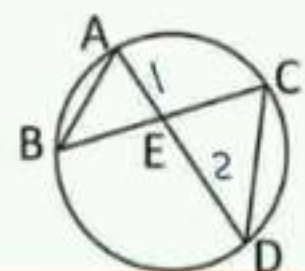
a) 2

b) 3

c) 4

d) 5

$$\begin{aligned} \frac{AE}{ED} &= \frac{1}{2}, \triangle AEB \sim \triangle DEC \\ \therefore \frac{\text{Area } \triangle AEB}{\text{Area } \triangle DEC} &= \left(\frac{AE}{ED}\right)^2 \\ \frac{\text{Area } \triangle AEB}{12} &= \frac{1}{4} \\ \text{Area } \triangle AEB &= \frac{12 \times 1}{4} = 3 \end{aligned}$$



Mr. Ahmed Bahi
Professor Of mathematics
01095680229

If $\frac{AX}{AB} = \frac{AY}{AC}$, $(\angle B) = 60$, then $2m(\angle A) = 3m(\angle AXY)$, then

$m(\angle A) =$

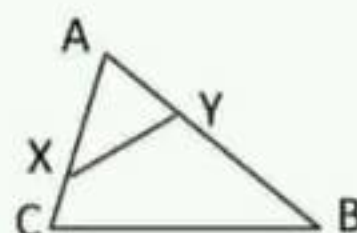
a) 120

b) 24

c) 48

d) 90

$$\begin{aligned} \triangle AXY &\sim \triangle ABC \\ \therefore \angle AXY &= \angle B = 60^\circ \\ \therefore 2m(\angle A) &= 3m(\angle AXY) \\ 2m(\angle A) &= 3 \times 60 = 180 \\ m(\angle A) &= 180 \div 2 = 90 \end{aligned}$$



In the opposite figure:

$EC = 3\text{cm}$, $ED = 18\text{cm}$, then $(AC - AD) =$

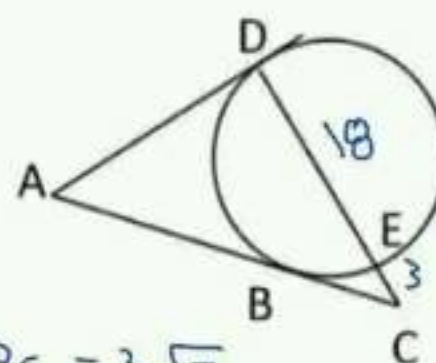
a) 7

b) $2\sqrt{7}$

c) $3\sqrt{7}$

d) $6\sqrt{7}$

$$\begin{aligned} (CB)^2 &= CE \times CD \\ (CB)^2 &= 3 \times 21 = 63 \\ CB &= 3\sqrt{7} \\ AC - AD &= AB + BC - AD = BC = 3\sqrt{7} \end{aligned}$$



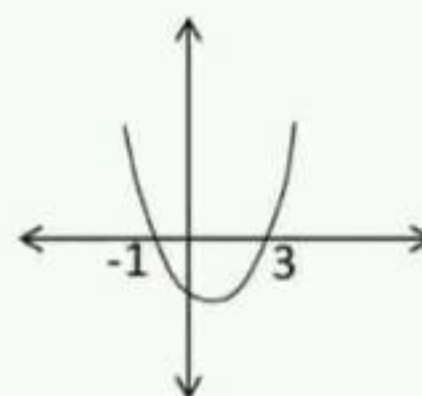
In the opposite figure: $(x) = ax^2 + bx + c$, which of the following is not true

a) -3 and 1 are two roots

b) 3 and -1 are two roots

c) $x = 1$ is the equation of the axis of symmetry

d) $y = f(1)$ is the minimum value



If $AB \parallel CD$, $BE + EA = 2$, $CE + ED = 3$, $AB = 6\text{cm}$, then

$CD = \dots\dots\dots$

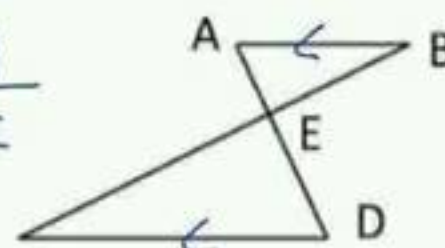
a) 9

b) 8

c) 7

d) 6

$$\begin{aligned} \triangle AEB &\sim \triangle DEC \\ \frac{AE}{DE} &= \frac{EB}{EC} = \frac{AB}{DC} = \frac{AE + EB}{DE + EC} \\ \frac{6}{CD} &= \frac{2}{3} \\ CD &= \frac{6 \times 3}{2} = 9 \end{aligned}$$



In the opposite figure:

$EA = 5\sqrt{2}\text{cm}$, $EB = BC$, then $EC =$

a) 5

b) 10

c) $10\sqrt{5}$

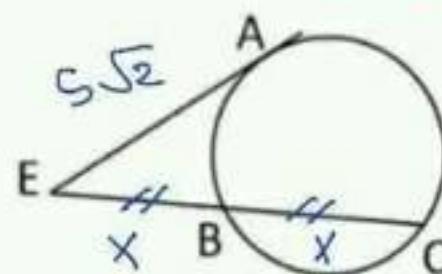
d) 15

$$(EA)^2 = EB \times EC$$

$$(5\sqrt{2})^2 = X \times 2X$$

$$50 = 2X^2$$

$$X^2 = 25 \Rightarrow X = 5$$



If $XY \parallel CB$, $AX : XB = 3 : 2$, $XY = m+2$, $BC = 2m-1$ cm, then $m = \dots\dots\dots$

a) 13

b) 6

c) 9

d) 12

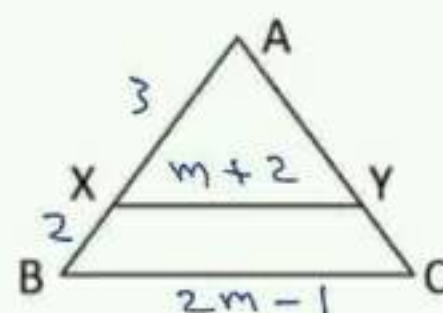
$$\triangle AXY \sim \triangle ABC$$

$$\frac{AX}{AB} = \frac{XY}{BC}$$

$$\frac{3}{5} = \frac{m+2}{2m-1}$$

$$5m+10 = 6m-3$$

$$13 = m \Rightarrow m = 13$$



The angle of measure $-\frac{\pi}{10}$ in the standard position is equivalent to the angle of measure

a) 702°

b) 240°

c) 360°

d) -660°

$$-\frac{\pi}{10} = \frac{-180}{10} = -18$$

$$\Rightarrow -18 + 360 = 342$$

$$\Rightarrow 342 + 360 = 702^\circ$$

If $a + bi = \frac{2}{2-i}$ and $a + bi$ are the roots of quadratic equation, then $a + b =$

a) -5

b) $\frac{2}{5}$

c) $\frac{4}{5}$

d) $\frac{6}{5}$

$$a + bi = \frac{2}{2-i} = \frac{4}{5} + \frac{2}{5}i$$

$$\therefore a = \frac{4}{5}, \quad b = \frac{2}{5}$$

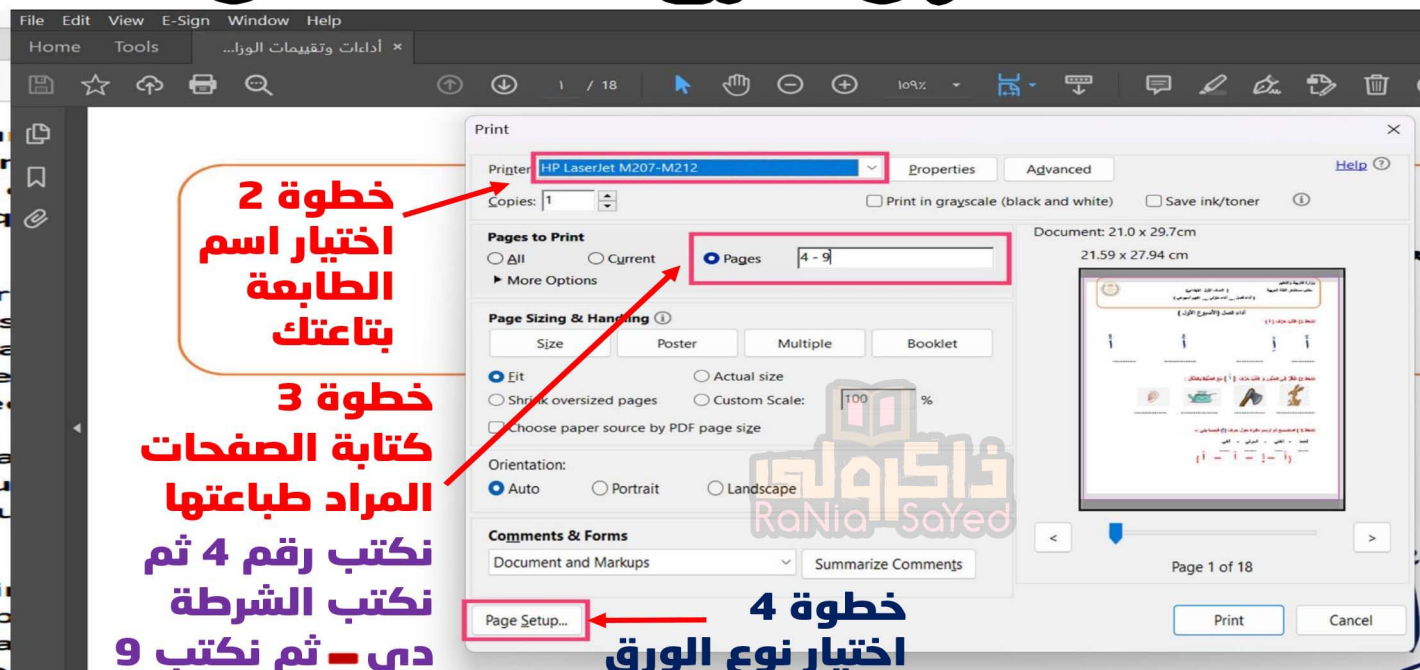
$$\therefore a + b = \frac{4}{5} + \frac{2}{5} = \frac{6}{5}$$

كيفية طباعة صفحات معينة من ملف معين

مثلا ازاي نطبع الصفحات من صفحة 4 الى صفحة 9



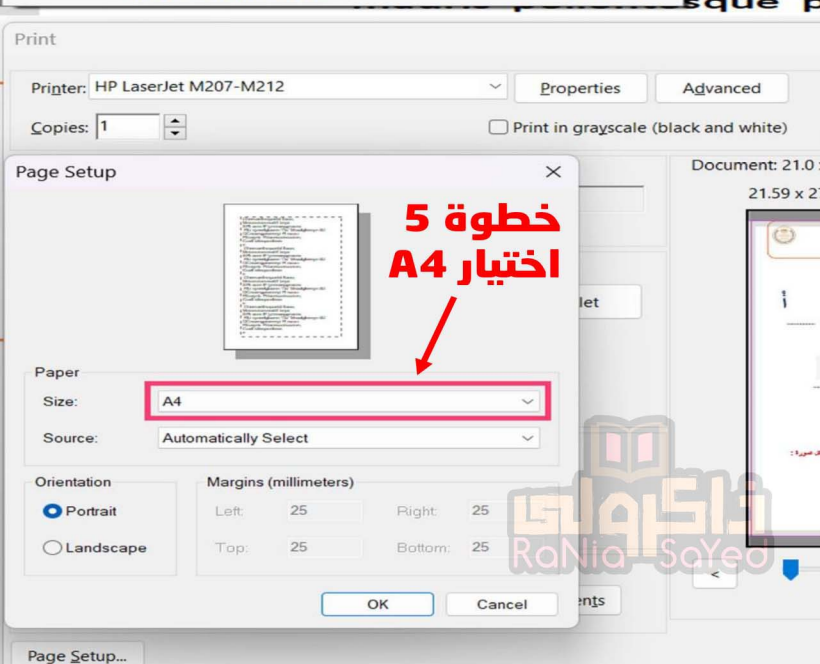
خطوة 1



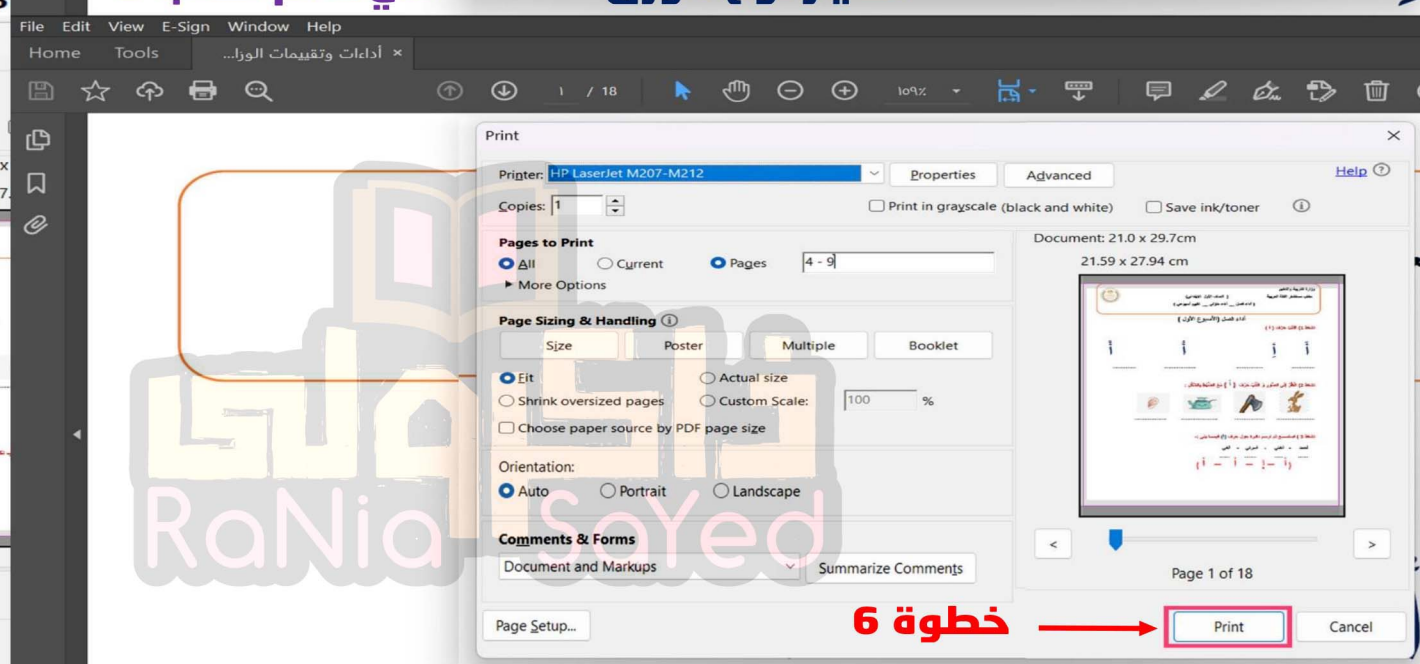
خطوة 2
اختيار اسم
الطابعة
بتاعتك

خطوة 3
كتابة الصفحات
المراد طباعتها
نكتب رقم 4 ثم
نكتب الشرطة
دي - ثم نكتب 9

خطوة 4
اختيار نوع الورق



خطوة 5
اختيار A4



خطوة 6